



MGM INSTITUTE OF HEALTH SCIENCES

(Deemed University u/s 3 of UGC Act, 1956)

Grade 'A' Accredited by NAAC

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Value Added Course

COURSE IN CLINICAL BIOMECHANICS



Dr. Rajesh B. Goel
Registrar

MGM Institute of Health Sciences
(Deemed University u/s 3 of UGC Act, 1956)
Navi Mumbai- 410 209



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Vice Chancellor
MGM Institute of Health Sciences
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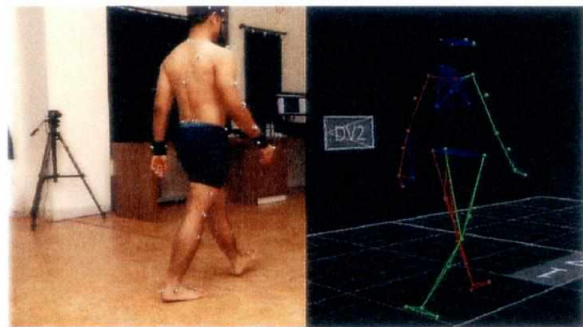
Our Partner: BETIC IITB

MGM Centre of Human Movement Science

Course in Clinical Biomechanics

Objectives

- ✓ Understand basic methodology of movement analysis
- ✓ Understand the principles of biomechanical modeling
- ✓ Understand theories of movement control and loading
- ✓ Able to integrate and apply the above to analyze movement problems encountered in patient population



Motion Analysis



Training Programs

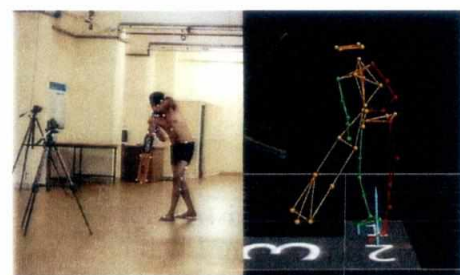
Learning Outcomes: On completion of this course you will achieve enhanced understanding of scope of movement analysis in patient evaluation



Clinical Services

Pre-requisites:

Students, clinicians and professionals with BSc in Health science and/or Engineering or related field relevant to the area of Clinical Kinesiology can apply



Exploring Sports

Schedule (Total number of hours: 30 hours)

Day	Activity	Resource Person
<i>Day 1:</i>		
<i>Activity: Movement Analysis & Modeling: Biological systems</i>		
8.00-9.40am	Kinematics of movements	Dr. Rajani P Mullerpatan
9.45-10.25am	Kinetics of movement: Forces, Moments & Power	Prof Robert Van Duersen
10.30-10.50 am	Tea Break	
10.50—11.30 am	Link segment modelling: Inverse dynamics	Prof Robert Van Duersen
11.35—12.15 pm	Musculo-skeletal modeling-I - theoretical approaches	Prof Robert Van Duersen
12.20 - 1.00 pm	Musculo-skeletal modeling-II - clinical examples	Prof Robert Van Duersen
1.00 - 2.00	Lunch	
<i>Activity: Movement Analysis & Modelling: Biological systems</i>		
2.00-2.40 pm	Muscle mechanics	Prof Robert Van Duersen
2:40 – 4:00 pm	Pressure measurement	Dr. Rajani P Mullerpatan
4.00 - 4.30 pm	Tea Break	
4.30 - 6.30 pm	Plantar pressure exercise	Dr. Rajani P Mullerpatan
<i>Day 2:</i>		
<i>Activity: Movement Analysis & Modelling: Biological systems</i>		
8.00-9.40am	Applications of medical imaging in clinical biomechanics	AlgoSurg Team
9.45-10.25am	Introduction to finite element modeling	Dr.Rupesh Ghyar
10.30-10.50 am	Tea break	
10.50—11.30 am	Comprehensive modeling	Dr.Rupesh Ghyar
11.30—12.30 pm	Rehabilitation technology-continuum from clinical needs-research –industry entrepreneurship	Prof B Ravi
12.30 - 01.30 pm	Lunch	
<i>Activity: Coordination of movement</i>		
1:30 – 2:10 pm	Biomechanical principles guiding prosthetic design	Dr Sujatha Srinivasan

2:10 – 2:50 pm	Application of biomechanical principles to guide Yogasana research	Dr Omkar
2:50 – 3:15 pm	Tea break	
3:15 -6:30 pm	Demo and Practice (Kinovea / Surface EMG / CosMed)	
<i>Day 3:</i>		
<i>Activity: Movement disorders in clinical environment</i>		
8.00-9.40am	Musculo-skeletal conditions: Relation between loading, joint stability & articular cartilage damage (OA)	Prof Robert Van Duersen
9.45-10.25am	Neurological conditions- Motor control in stroke & CP- RPM,TS,AM	Dr. Rajani P Mullerpatan, Dr. Triveni Shetty (PT)
10.30-10.50 am	Tea break	
10.50—11.30 am	Activity monitoring & measurement of energy cost	Dr.Bela Agarwal (PT)
11.35—12.15 pm	Tissue Stress (Mechanics of hard and soft tissue, muscles, tendons, bone, cartilage, ligaments and development of material models of these tissues)	Dr Rajani Mullerpatan
12.20 - 1.00 pm	Group discussions-groups Use of movement analysis to guide rehabilitation -roadmaps	Dr.Bela Agarwal (PT) & Dr.Yuvraj Singh (PT)
1.00-1.40 pm	Plenary-Presentations from group discussions 5 min presentation for each group	Prof.B.Ravi & Dr. Rajani P Mullerpatan
1:40 – 2:40 pm	Lunch	
<i>Activity: Integration</i>		
2.45 - 3.30pm	Framework for clinical applications	Dr. Rajani P Mullerpatan
3.30-5.00pm	Course Evaluation & feedback (opinion)	Dr. Rajani P Mullerpatan
5.00pm onwards	Tea	

Resource Persons

Prof. Robert Van Deursen, Cardiff University, UK: Prof. Robert obtained a BSc in Physiotherapy in Utrecht, the Netherlands in 1981 and between 1982 and 1992 worked as a physiotherapist in various rehabilitation settings in the Netherlands, India, Sri Lanka and Zimbabwe. He studied at the Faculty of Human Movement Sciences, Free University, Amsterdam for an MSc (cum laude) in Movement Science (1991-1994) and at the Center for Locomotion Studies, The Pennsylvania State University, USA (1994 -1997) for a PhD in Biomechanics and Locomotion Studies. Prof.



Robert joined the Department of Physiotherapy Education, University of Wales College of Medicine, Cardiff in 1998 as Lecturer/Research Co-ordinator; established the Research Centre for Clinical Kinaesiology in 1999; and became Senior Lecturer in 2002. In 2004, he was appointed as Director of Physiotherapy and became Chair of Research Strategy Committee, School of Healthcare Studies, in 2005.

Professor B Ravi – IIT B: Dr. B. Ravi is an Institute Chair Professor of Mechanical Engineering at IIT Bombay. He is a product of three well known institutions: National Institute of Technology (Rourkela) where he did his B.E. in 1986, Indian Institute of Science (Bangalore) for Masters and Ph.D., and Indian Institute of Technology (Bombay), where is working for the last 22 years. He held short visiting appointments in USA at West Virginia (1996) and Purdue University (2006). Prof. Ravi is committed to indigenous product innovation, and enhancing the employability of engineering students in the manufacturing sector.



Prof. Rajani Mullerpatan, MGM Center of Human Movement Science, MGMIHS, Navi Mumbai: Dr Rajani leads University Dept of Physiotherapy at MGM Institute of Health Sciences, Navi Mumbai. After completing her doctoral program at Research Centre for Clinical Kinesiology at Cardiff University, UK, she is currently focused on development of Biomechanics in India to meet local healthcare needs of Indian population. She has collaborated with leading national and international institutions in UK, Canada & Australia to promote training and research in clinical biomechanics & clinical rehabilitation and application in clinical care.



Dr. Bela Agarwal (PT), MGM Center of Human Movement Science, MGMIHS, Navi Mumbai: Dr. Bela completed her graduation from Seth.GS Medical College, Mumbai affiliated to the Bombay University with a ranked position and masters in Cardiovascular and Pulmonary Physiotherapy from LTMMC, Mumbai in 1992 again with a University rank. She has been working in the profession for 18 years in a variety of setups which include private clinics, hospitals and teaching institutes and has 9 years of teaching experience which included teaching graduate and post graduate student. Her interest lies in research in field of cardiopulmonary rehabilitation.



Dr. Rupesh Ghyar, BETiC- IITB: Rupesh holds a doctorate degree from IIT Bombay. His PhD thesis focused on Systematic Approach for Functional and Surgical Suitability Evaluation of Mega Endo-prostheses, which involves standardization of FEA coupled with experimental evaluation. He has a Masters degree was in Bioengineering, from University of Strathclyde (UK) and Bachelor's degree, in Mechanical Engineering, COEP ,Pune. He has worked for six years as a Senior Research Associate in OrthoCAD Network Research Cell at IIT Bombay. Earlier, he was a business development manager for OSIM India, an orthopaedic implant manufacturer.



Dr Sujatha Srinivasan: Dr. Sujatha graduated with her B.Tech in Mechanical Engineering from IIT-Madras in 1992, her MSME from the University of Toledo, USA in 1994, and after a long stint in the prosthetics industry, her PhD from the Ohio State University in 2007. She joined the faculty at IIT-Madras in 2008. Dr. Sujatha's work is in the areas of Prosthetics and Orthotics, Biomechanics and Mechanisms. Her Rehabilitation Research and Device Development (R2D2) group focuses on the development of assistive devices and aids for rehabilitation that are biomechanically and economically suited to Indian lifestyles and conditions.



Dr Omkar: Dr. Omkar is a visionary personality having more than 3 decades of experience in yoga. He is the direct disciple of Padmavibhushan Yogacharya Dr. B K S Iyengar and an ardent follower of the principles and philosophy of Sage Patanjali. With an academic accreditations of BE (Mechanical), M.Sc. (Engineering), PhD in Aerospace Engineering, currently Dr. S N Omkar is working as Chief Research Scientist at Indian Institute of Science, Dept of Aerospace Engineering.



Contact Info

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Fee: INR 5000/- to be paid as Demand Draft in favor of MGM School of Physiotherapy, payable
at Navi Mumbai

