



MHRD Scheme on Global Initiative on
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By,
Prof. Yasushi Takemura
Yokohama National University
Japan

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2017
TO
1st December
2017

GIAN

Government
Engineering
College

GANDHINAGAR



Fundamental and Applications of Magnetics : Recent Development Towards Biomedical Engineering

OVERVIEW

We may think of magnetic resonance imaging (MRI) from the terms of magnetism and medical treatment. MRI is a tomographic method for diagnosis using nuclear magnetic resonance (NMR). There is also computed tomography (CT) using x-ray, whose equipment looks quite similar to MRI. But, technical principles of these two diagnostic methods are completely different. The advantages of MRI, e.g. imaging not affected by bone and no risk of exposure to radiation, arise from the use of a magnetic field.

A magnetic field penetrates into the human body, although there is a certain loss in case of the field at high frequency. It can supply energy with relatively high energy density, and is expected for use in medical application as functions of heating, transport, power-supply and others. After introducing fundamentals of magnetism and magnetic materials, principles, recent development and future prospect of magnetism for biomedical application are reviewed.

OBJECTIVES

1. Learn the fundamental and application of magnetism.
2. Learn the essentials of magnetism and magnetic materials.
3. Learn how to generate and detect a magnetic field.
4. Study principles of magnetic sensor and data storage using magnetism.
5. Study biomedical application of magnetism and recent development of magnetic nanoparticles.

TARGET AUDIENCE

- Executives, Entrepreneurs, Engineers and Researchers from Manufacturing, Service and Government organizations including R&D laboratories.
- Student all levels (BTech/M-Sc/MTech/PhD) or Faculty from reputed academic institutions and technical institutions.
- Interested individuals/groups in Magnetism/Nano materials/Bio medical/Science & Allied field.

COURSE DETAILS

Day	Lecture /Tutorial No	Content delivery
I	L1, L2	Brief introduction of magnetics Fundamental of magnetism
	T1	Hands on / Tutorial / Exercise
II	L3, L4	Fundamental of magnetic materials Magnetic properties of magnetic materials
	T2	Hands on / Tutorial / Exercise
III	L5, L6	Application of magnetic materials Generation and detection of a magnetic field
	T3	Hands on / Tutorial / Exercise
IV	L7, L8	Magnetic sensors Data storage using magnetics
	T4	Hands on / Tutorial / Exercise
V	L9, L10	Biomedical application of magnetics Magnetic nanoparticles and their application
	S1	Self assessment / review of this lecture

INVITED FACULTY



Yasushi Takemura is Professor at Division of Electrical and Computer Engineering, Yokohama National University, Japan. He received the B.S., M.S. and Ph.D. degrees in Electrical and Electronic Engineering from Tokyo Institute of Technology, Japan, in 1988, 1990 and 1993, respectively. He is in charge of Assistant to the President of Yokohama National University.

He has been a Visiting Professor at Graduate School of Medicine of Yokohama City University, Japan and a Visiting Researcher at Paul Drude Institute for Solid State Electronics, Berlin, Germany from 1997 to 1998.

He has authored more than 110 research papers in international journals. He has also co-authored two textbooks. His research interests are magnetic nanostructures and their device application, bio-medical application of magnetic nanoparticles, medical equipment and magnetic sensor.

He is currently a director of Magnetism Society of Japan, and a delegate of Asian Union of Magnetism Society from Japan. He is an active organizer and reviewer for a number of international conferences and journals.

REGISTRATION FEES

For course registration please visit: <http://www.gian.iitkgp.ac.in/GREGN/index>

Participants From	Fee
Abroad	USD 500
Industry/ Research Organizations	Rs. 10000
Academic Institutions (Faculty)	Rs. 5000
Students	Rs. 2000

- The registration fee which is non refundable is inclusive of course material, high tea, working lunch during the course duration. The fees should be paid by DD in favor of “The Principal, Government Engineering College, Gandhinagar” payable at Gandhinagar.
- Principally, no accommodation will be provided to participants. However, institute will help to find the reasonable accommodation on request. Student participants will be provided hostel facilities by paying nominal fee. The communication in advance regarding accommodation is desirable.

CO-ORDINATORS

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