

# Gujarat Technological University

## *Report: Faculty Development Program (FDP) of new curriculum for Degree Engineering Program on 21<sup>st</sup> September 2013 at GTU Chandkheda Campus.*

### *“Elements of Electrical Engineering”*

More than 90 faculty members from various degree engineering colleges affiliated to GTU attended the FDP.

#### **The objectives of the program were:**

- To discuss the content to be covered for various topics,
- How to deal with the course
- To discuss about the progressive assessment and practical examination
- How to use E-learning resources for the course

These objectives were intended for synchronization among faculties about the contents of syllabus and to adapt best practices for teaching the course.

**Session 1 : 11:00 am to 12:00 noon**  
**Speaker : Prof. V B Babaria, Ex. Professor & Head of EE Dept., LD CE**  
**Topic : Teaching methodology for Elements of Electrical Engineering**

The first lecture was delivered by Prof. V B Babaria, Ex. Professor and Head, Electrical Engineering Dept, L D College of Engineering, Ahmedabad.

He talked about

- Explained the importance of the course as it is fundamental course and being offered in all the branches of engineering.
- Gave idea about how the course can be made interesting for the students of first year by giving various practical aspects.
- Depth and difficulty levels for each topic were clearly explained.
- Asked faculty members to put more stress on practical instead only theory.
- Shared his experience and motivated the faculty members to work for the excellence and devotion towards the course.



**Session 2** : **12:00 noon to 1.00 pm**  
**Speaker** : **Dr. A J Mehta, Director, Gujarat Power Engineering and Research Institute, (First PPP mode code), Mehsana**  
**Topic** : **Content coverage, and changes in the new syllabus of EEE**

Dr. Mehta acts as co-coordinator for the syllabus revision committee of EE, GTU.

- Introduced the committee members involved in the syllabus revision process.
- He gave the overview of revised syllabus of the course and clearly brought out the changes incorporated in different topics.
- He also justified the objectives of the revision with importance of outcome based education and accreditation of engineering programs.
- He explained that the new format of syllabus is as per NBA requirement where prerequisite, percentage weightage of each module, course outcomes, list of experiments, etc... are clearly mentioned.
- The participants were also informed about the flexibility given to individual institute about the laboratory work.
- They were also updated about submission of innovative experiments by individual institute at the end semester to GTU.
- He also talked about Active learning assignments incorporated as a part of progressive assignment of theory component and case study incorporated as a part of progressive assignment of practical component.

**Session 3** : **2:00 pm to 3.00 pm**  
**Speaker** : **Pearson Publication**  
**Topic** : **e- Learning solutions for Engineering**

The post lunch session was delivered by the Mr. Bhusan Sharma and Ms. Zahida Sama, representative of Pearson Publication Ltd. Mr. Bhusan talked about the learningware which enables the faculty and students for online interaction, sharing the information, class note examination, virtual experimentation and evaluation online. Ms. Zahida informed about Think Tank software which is Pearson's collection of 3000 books. The collection may be accessed by the faculty members free for a week period through their institute IP address.

**Session 4** : **3:00 pm to 4:00 pm**  
**Speaker** : **Cognifront Ltd.**  
**Topic** : **e- Learning tools**

The session was delivered by the Mr. Jaydev Bhatt, He talked about the software tool available for better visualization of the engineering concept by animation. He showed various examples of electrical engineering to the participants.

**Session 5** : **3:30 pm to 4.30pm**  
**Speaker** :  
**Topic** : **Open discussion**

In this session, the participant discuss about inclusion of few topics in the new syllabus such as Temperature effect on resistance, Charging discharging of capacitor and rise and decay of current in inductive circuit.

**In the conclusion session, Dr. G. P. Vadodaria, In-charge Registrar and In-charge Controller of Examination of GTU briefed the participants about common mistakes done by paper setters and examiners. He also told that utmost care must be taken while drawing the question papers and assessing the answer books.**

Concluding remarks were given by Dr A J Mehta and thanked all the participants for their active participation in FDP.



## “Physics Curriculum Overview”

On 21<sup>st</sup> September, 2013 Gujarat Technological University had organized a FDP on curriculum overview of Engineering Physics. On the process of up gradation of academic contain University has decide to review the curriculum and upgrade it on the current academic year. For the effective and uniform implementation of curriculum and to streamline the depth of topic it was necessary to organize this program.

More than 60 institute representatives were present on that day. First necessary of revision was discussed. Brief idea about importance of topics to fill gap of Pos and PEOs were discussed for NBA accreditation. Individual discussion on chapter wise and topic wise was carried out. Newly introduced minor project activities were discussed and sample cases were given to participants. Review and discussion on newly introduced chapters were carried out by Dr. Nirali Gondaliya.

Dr. Amit Patel had carried out detail presentation on depth of each and every topic and sub-topics to maintain uniformity at all institutes. The brief is discussed as below:



<b>UNIT--1: DIELECTRICS</b>		
<b>TOPICS</b>	<b>COURSE OUTCOME</b>	<b>DEPTH REMARK</b>
Definitions : Electric field intensity, Electric flux, Dielectric parameters	Define Electric field intensity, Electric flux and various Dielectric parameters.	<ul style="list-style-type: none"> <li>➤ Definitions,</li> <li>➤ Significance,</li> <li>➤ Unit,</li> <li>➤ Equations</li> </ul>
Types of Dielectric materials : Solid, Liquid and Gaseous	→ Explain Dielectric Polarization and differentiate different types of polarizations. → Understand the properties of dielectric materials	<ul style="list-style-type: none"> <li>➤ Classification,</li> <li>➤ Explanation,</li> <li>➤ Examples,</li> <li>➤ Applications</li> </ul>
Classification of electrical insulating materials		<ul style="list-style-type: none"> <li>➤ Classification,</li> <li>➤ Explanation</li> </ul>
Claussius-Mosotti equation		
Uses of Dielectric Materials; <b>Capacitors: Single and multilayer, Polymeric Film, Electrolytic; Power and Distribution transformers, other applications</b>	Understand the utilization of dielectric materials in different areas.	explanation

<b>UNIT--2: MAGNETIC MATERIALS</b>		
<b>TOPICS</b>	<b>COURSE OUTCOME</b>	<b>DEPTH REMARK</b>
<b>Definitions:</b> Magnetic moment, Magnetic dipole, Magnetic Filed strength, Magnetic flux density, Intensity of magnetization, Magnetic dipole moment, Magnetic Field intensity, Magnetic permeability, magnetic susceptibility, Bohr magnetron	Define Magnetic moment, Magnetic dipole, Magnetic Filed strength, Magnetic flux density, Intensity of magnetization, Magnetic dipole moment, Magnetic Field intensity, Magnetic permeability, magnetic susceptibility, Bohr magnetron	<ul style="list-style-type: none"> <li>➤ Definitions,</li> <li>➤ Significance,</li> <li>➤ Unit,</li> <li>➤ Equations</li> </ul>
Classification of Magnetic Materials on the basis of magnetic moment	Classify magnetic materials based on magnetic moment and different properties.	<ul style="list-style-type: none"> <li>➤ Classification,</li> <li>➤ Explanation</li> </ul>
Soft and Hard Magnetic Materials	Distinguish between Soft and Hard Magnetic Materials: Their examples and applications.	<ul style="list-style-type: none"> <li>➤ Classification,</li> <li>➤ Explanation</li> </ul>

**UNIT---3: ACOUSTIC AND ULTRASONIC**

TOPICS	COURSE OUTCOME	DEPTH REMARK
Introduction, Classification and Characteristics of sound	→Define acoustics and sound; know about types of sound and its properties. →Analyze Music and Noise with measurement techniques and further classifications	Explanation
Sabine's formula for reverberation (Without Derivations) Introduction of Absorption coefficient		Explanation (no derivation)
Sound absorbing materials		Introduction
Factors affecting the acoustics of building and their remedies		Explanation
Sound Insulation		Explanation
Noise Pollutions		Explanation
Noise Control in machines		Explanation

**UNIT---4: SUPERCONDUCTIVITY**

TOPICS	COURSE OUTCOME	DEPTH REMARK
Superconductivity	→Know Superconducting materials: Introduction and History. →Define transition temperature, Relate temperature & resistivity.	➤ Introduction ➤ Definitions
General Properties of superconductors	List out general Properties of superconductors.	Explanation
Types of Superconductors	Determine types of superconductors based on transition temperature and critical magnetic field.	Explanation
High Temperature superconductors		Explanation
Applications: <b>Magnets, Josephson effect, SQUID, Maglev, other</b>	Apply knowledge of superconductors in a field of SQUID, CRYOTRON, Josephson devices, and magnetic levitation.	Explanation

**UNIT---5: NON LINEAR OPTICS**

TOPICS	COURSE OUTCOME	DEPTH REMARK
<b>LASER</b> Introduction	Comprehend the properties of LASER.	Introduction
Characteristics of laser radiation		Explanation
Spontaneous and stimulated emission	Define and explain spontaneous, stimulated emission, population inversion.	Explanation Einstein's theory
Working of LASER with basic idea about Population Inversion, Pumping mechanism, Optical Resonators	Describe working and components of a typical LASER.	Roles of components of laser
Nd:YAG LASER		Principle Construction Working
Applications of LASER: <b>Medical, Industrial, Communication and other</b>	Describe applications of laser in industry specifically welding, cutting and drilling. List out applications of LASER in other fields.	Explanation

**UNIT---5: NON LINEAR OPTICS**

TOPICS	COURSE OUTCOME	DEPTH REMARK
<b>FIBER OPTICS</b> Introduction of Optical Fiber	Explain construction of Optical Fiber.	Principle Structure
Advantages of Optical Fiber		Brief explanation
Total Internal Reflection	Define Total Internal Reflection.	Definition
Numerical Aperture and Acceptance angle	Compute mathematical parameters required for operation of optical fiber.	Derivation
Modes of Propagation	Understand modes of light propagation through an optical fiber.	Explanation
Types of Optical Fiber	Classify types of optical fiber based on materials, propagations and refractive index.	Explanation
Applications of optical fiber	Apply knowledge of Optical fiber in field of Engineering, industry and medical instrumentations.	Explanation

**UNIT--6: NANOPHYSICS**

TOPICS	COURSE OUTCOME	DEPTH REMARK
Nanoscale	Define nanomaterials,	Introduction
Surface to volume ratio Surface effects on Nanomaterials	Understand surface to volume ratio, Surface effects of Nanomaterials,	Explanation
Quantum size effects	→Understand Quantum size effects and Electron confinement in nanomaterials. →Classify among One, two and three dimensional nanoparticles and can list out its applications in technology.	Explanation
Electron confinement		Explanation
Nanomaterials and Nanotechnology		Explanation
Unusual properties of Nanomaterials	Explain Optical, Electrical, Mechanical, magnetic and chemical properties of nanomaterials.	Explanation
Disadvantages of Nanomaterials	List out advantages and disadvantages of Nanomaterials.	Discuss

**UNIT--7: ADVANCED ENGINEERING MATERIALS**

TOPICS	COURSE OUTCOME	DEPTH REMARK
<b>SHAPE MEMORY ALLOYS</b> Introduction, Synthesis, Properties and Applications	Explore the knowledge on shape memory materials. Discuss shape memory effect and special features of SMA. Understand different characterization tools to explore the phase transformation temperatures. List out commercial applications of SMA.	<ul style="list-style-type: none"> <li>➤ Principle of phase transformation</li> <li>➤ Hysteresis</li> <li>➤ Two way SMAs</li> <li>➤ Pseudo Elastic Effect</li> <li>➤ Thermoelastic properties</li> <li>➤ Applications</li> </ul>
<b>METALLIC GLASSES</b> Introduction, Synthesis, Properties and Applications	Understand the principle, preparation, properties and application of metallic glasses. Discuss important applications of metallic glasses in different fields. Comprehend about biomaterials.	<ul style="list-style-type: none"> <li>➤ Principle</li> <li>➤ Preparation</li> <li>➤ Structural prop.</li> <li>➤ Mechanical prop.</li> <li>➤ Electrical prop.</li> <li>➤ Magnetic prop.</li> <li>➤ Chemical prop.</li> <li>➤ List of applications</li> </ul>



**UNIT--7: ADVANCED ENGINEERING MATERIALS**

TOPICS	COURSE OUTCOME	DEPTH REMARK
<b>BIO MATERIALS</b> Introduction, Synthesis, Properties and Applications	Classify biomaterials based on their properties. Understand the properties of biomaterials and their applications.	<ul style="list-style-type: none"><li>➤ Introduction</li><li>➤ Bio-inert</li><li>➤ Bio-active</li><li>➤ Bio-degradable</li> <li>➤ 1<sup>st</sup> ,2<sup>nd</sup> ,3<sup>rd</sup> generation</li> <li>➤ Metals &amp; alloys</li><li>➤ Polymers</li><li>➤ Hydrogels</li><li>➤ Composites</li><li>➤ Ceramics</li><li>➤ List of applications</li></ul>
<b>ENERGY MATERIALS</b> Solar cells Fuel cells (H <sub>2</sub> O <sub>2</sub> , Lithium cell) Ultra capacitors	Explain Principle, Working and applications of Solar cells, Fuel cells and Ultracapacitors.	<ul style="list-style-type: none"><li>➤ Principle</li><li>➤ Working</li><li>➤ Applications</li></ul>

