

GUJARAT TECHNOLOGICAL UNIVERSITY

INSTRUMENTATION AND CONTROL (03)

INSTRUMENT DESIGN ENGINEERING

SUBJECT CODE: 3710316

M.E. 1st SEMESTER

Type of course: Program Elective II

Prerequisite: : Design various electronic circuits and measurement systems, noises identification and appropriate elimination methods

Rationale: This course provides an overview and fundamentals of various types of Instruments Designing and analyze and justify the requirement of Instrument and systems.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE(E)	PA (M)	ESE (V)	PA(I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	Electromagnetic Compatibility: Noise, Interference, Noise Coupling, cabling, grounding, ground loops, balancing and filtering	08	18%
2	Shielding: Near field, far field, absorption losses, and reflection losses	08	22%
3	Contact Protections: Arc discharge, Glow discharge, intrinsic noise sources, active device noise, digital circuit grounding	08	22%
4	EMC Applications: Digital circuit power distribution, Digital circuit radiations, Conducted emissions, RF and transient immunity, electrostatic discharge, PCB layout and design, EMC measurements.	10	25%
5	Safety Introduction ,Electrocution Risk, Earthling (Grounding) and Bonding Flammable Atmospheres ,Other Safety Aspects, Conclusion	06	13%

Reference Books:

1. Henry W Ott, Jonh , “Electromagnetic Compatibility Engineering”, Wiley and Sons Inc. Publication
2. W. C. Bosshart, “PCB Design and Technology” Tata McGraw Hill
3. Clyde F. Coombs, “Electronic Instrument Handbook”, McGraw Hill, Third Edition

Course Outcome:

After learning the course the students should be able to:

CO1 An ability to analyze and justify the requirement of Instrument and systems.

CO2 An ability to design various electronic circuits and measurement systems, noises identification and appropriate elimination methods related to instrument and system

CO3 An ability to select, design appropriate enclosure, cables, PCB.

CO4 An ability to estimate, analyze, improve the reliability of instrument and system

List of Tutorials:

Student has to prepare various algorithms for developing control strategies techniques covered in this course with any computing tools (MatLab, Scilab, etc...).

Prepare research paper and submit report of various algorithms for developing control strategies techniques covered in this course.

Major Equipment:**List of Open Source Software/learning website:**

□ □ NPTEL

Review Presentation (RP): The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester.