



**NATIONAL INSTITUTE OF TECHNOLOGY,
TIRUCHIRAPPALLI**

DEPARTMENT OF ELECTRICAL & ELECTRONICS

COURSE PLAN – PART I			
Name of the programme and specialization	B. Tech in Electrical and Electronics Engineering		
Course Title	Measurements and Instrumentation		
Course Code	EEPC23	No. of Credits	4
Course Code of Pre-requisite subject(s)	EEPC17		
Session	January 2019	Section (if, applicable)	A & B
Name of Faculty	Dr. Shelas Sathyan	Department	Electrical and Electronics
Official Email	shelassathyan@nitt.edu	Telephone No.	9561450634
Name of Course Coordinator(s) (if, applicable)			
Official E-mail		Telephone No.	
Course Type (please tick appropriately)	<input checked="" type="checkbox"/> Core course	<input type="checkbox"/> Elective course	
Syllabus (approved in BoS)			
<p>Measurements – Errors & classification, Measurement of voltage & current - permanent magnet moving coil and moving iron meters, Digital voltmeters and automation, guarding techniques.</p> <p>Measurement of power and energy - dynamometer and induction instruments, kVAh and kVARh meters, maximum demand indicators, digital multi-meters. Instrument transformers – Current and Potential transformers. Spectrum Analyzers, Data & Logic Analyzers.</p> <p>Measurement of resistance, inductance and capacitance using dc and ac bridges, Transducers Position transducers, force transducers, piezo-electric transducers, Hall effect transducers. Temperature measurement.</p> <p>Signal sources – Oscillators, Function generator & pulse generators. Oscilloscopes - CRO, Digital storage and Analog storage Oscilloscope, Digital Phosphor Oscilloscopes. Analog & Digital Recorders and printers.</p> <p>Signal conditioners – Instrumentation amplifiers, voltage-current converters, voltage-frequency converters, analog multiplexers and de-multiplexers. Microprocessor Based Measurements, Case Studies in Instrumentation.</p> <p>Text Books:</p> <ol style="list-style-type: none"> 1. A. K. Sawhney, 'A Course in Electrical and Electronic Measurements and Instrumentation', Dhanpat Rai & Co., 9th Edition, 2015. 			



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2. Kalsi H.S, 'Electronic Instrumentation', Tata McGraw-Hill Education, 3rd Edition, 2010.
3. Deobelin, 'Measurements Systems', Tata McGraw Hill Publications, 2nd Edition, 2010.
4. Bouwens A. J., 'Digital Instrumentation', Tata McGraw Hill Publications, 16th Reprint (2008).

COURSE OBJECTIVES

To understand the basic operation of different measuring instruments and thereby able to choose appropriate instruments for measuring different parameters

MAPPING OF COs with POs

Course Outcomes	Programme Outcomes (PO) (Enter Numbers only)
1. Describe the working principle of different measuring instruments.	1,3,2
2. Choose appropriate measuring instruments for measuring various parameters in their laboratory courses.	1,8
3. Correlate the significance of different measuring instruments, recorders and oscilloscopes.	1,2,3,7,8
4. Develop a micro-processor based measuring unit for any practical application	1,7,8

COURSE PLAN – PART II

COURSE OVERVIEW

Understand the operation and constructions of various measurement devices

COURSE TEACHING AND LEARNING ACTIVITIES

(Add more rows)

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	Week 1(7/1/19-11/1/19)	Introduction, Measurements – Errors & classification	Chalk & Talk
2	Week 2 (14/1/19-18/1/19)	Measurement of voltage & current - permanent magnet moving coil and moving iron meters	Chalk & Talk
3	Week 3 (21/1/19-25/1/19)	Measurement of power and energy - dynamometer and induction instruments, kVAh and kVARh meters	Chalk & Talk
4	Week4 (28/1/19-1/2/19)	Instrument transformers – Current and Potential transformers	Chalk & Talk



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5	Week 5 (4/2/19-8/2/19)	Measurement of resistance, inductance and capacitance using dc and ac bridges,	Chalk & Talk
6	Week 6 (11/2/19-15/2/19)	Transducers – Position transducers, force transducers	Chalk & Talk
7	Week 7 (18/2/19-22/2/19)	piezo-electric transducers, Hall effect transducers. Temperature measurement	Chalk & Talk
8	Week 8 (25/2/19-1/3/19)	Signal sources – Oscillators, Function generator & pulse generators. Oscilloscopes - CRO	Chalk & Talk
9	Week 9 (4/3/19-8/3/19)	Digital storage and Analog Storage Oscilloscope, Digital Phosphor Oscilloscopes. Analog & Digital Recorders	Chalk & Talk
10	Week 10 (11/3/19-15/3/19)	Signal conditioners – Instrumentation amplifiers, voltage–current converters	Chalk & Talk
11	Week 11 (18/3/19-22/3/19)	voltage-frequency converters, analog multiplexers and de-multiplexers	Chalk & Talk
12	Week 12 (25/3/19-28/3/19)	Microprocessor Based Measurements, Case Studies in Instrumentation.	Chalk & Talk
13	Week 13 (1/4/19-5/4/19)	Digital voltmeters and automation, guarding techniques	Chalk & Talk
14	Week 14 (8/4/19-12/4/19)	Spectrum Analyzers, Data & Logic Analyzers, and printers	Chalk & Talk

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	First cycle test	4/2/19	1 hour	20
2	Second cycle test	2/4/19	1 hour	20
3	Surprise Quiz	1/3/19-30/3/19	1 hour	10



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CPA	Compensation Assessment*	23/04/19- 26/04/19	1 hour	20
4	Final Assessment *	29/4/2019- 3/5/2019	2 hours	50

***mandatory; refer to guidelines on page 4**

COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

1. Students feedback through class committee meetings
2. Feedback questionnaire from students – twice during the semester
3. Feedback from students on the course outcomes shall be obtained at the end of the course

COURSE POLICY (including compensation assessment to be specified)

1. Flexibility is given to the students to fix the date for each assessment convenient to majority of the students. Attending all the assessments (1, 2, 3, 4) are mandatory for every student.
2. If any student fails to attend the assessment 1,2 or 3 or both due to genuine reason like medical emergency, the student may be permitted to appear for only one compensation assessment (CPA) on submission of appropriate documents as proof.
3. The compensation assessment (CPA) is on all units and in any case, CPA is not considered as an improvement test.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

- At least 75% attendance in each course is mandatory.
- A maximum of 10% shall be allowed under On Duty (OD) category.
- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.



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- The above policy against academic dishonesty shall be applicable for all the programmes.

ADDITIONAL INFORMATION, IF ANY

FOR APPROVAL

Course Faculty 

CC- Chairperson 

HOD 

Guidelines

- a) The number of assessments for any theory course shall range from 4 to 6.
- b) Every theory course shall have a final assessment on the entire syllabus with at least 30% weightage.
- c) One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered.
- d) The passing minimum shall be as per the regulations.

B.Tech. Admitted in				P.G.
2018	2017	2016	2015	
35% or (Class average/2) whichever is greater.		(Peak/3) or (Class Average/2) whichever is lower		40%

- e) Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.
- f) Absolute grading policy shall be incorporated if the number of students per course is less than 10.
- g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.