

2.6.1 Programme and course outcomes for all Programmes offered by the institution are stated and displayed on website and communicated to teachers and students

JCT COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
NEWS LETTER 2020-2021 VOLUME I

INSTITUTE VISION

To emerge as a Premier Institute for developing industry ready engineers with competency, initiative and character to meet the challenges in global environment.

INSTITUTE MISSION

- To impart state-of-the-art engineering and professional education through strong theoretical basics and hands on training to students in their choice of field.
- To serve our students by teaching them leadership, entrepreneurship, teamwork, values, quality, ethics and respect for others.
- To provide opportunities for long-term interaction with academia and industry.
- To create new knowledge through innovation and research.

OUR VISION

Emerging as a Center of Excellence in Electrical and Electronics Engineering Education for studies and research.

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- To create state-of art facilities for teaching, learning, laboratory practices and research.
- To develop competent engineers through value addition programs, products incubation, interactive seminars, communication programs, group discussions, trainings, etc.
- To initiate collaborative relationships with Industries and Institutions for real-life experiences.

PROGRAM EDUCATIONAL OBJECTIVES

- I. Graduates shall have successful career in industry or have motivation for higher education or research.
- II. Graduates shall apply their knowledge of Electrical and Electronics Engineering and work as part of a team on multidisciplinary projects.
- III. Graduates shall have lifelong learning skills, professional ethics and good communication capabilities along with entrepreneur skills and leadership, so that they can succeed in their life.

PROGRAM OUTCOMES

1. **Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
2. **Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct Investigations of Complex Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and Teamwork:** Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project Management and Finance:** Demonstrate knowledge and understanding of the engineering management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-Long Learning:** Recognize the need for and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES

PSO1: Have abilities to apply their knowledge in the domain of Electronics, Electrical Drives, Power Generation and Transmission, Power Electronics and Control system for the benefits of the society and the Nation.

PSO2: Have abilities to successfully qualify in national level competitive examinations for higher studies and employment.

PROGRAMME EDUCATIONAL OBJECTIVE



PEO

- PEO1: Graduates shall have successful career in industry or have motivation for higher education or research.
- PEO2: Graduates shall apply their knowledge of Electrical and Electronics Engineering and work supported a team on multidisciplinary projects.
- PEO3: Graduates shall have lifelong learning skills, professional ethics and good communication capabilities along with entrepreneurial skills and leadership, so that they can succeed in their life.

PROGRAMME OUTCOME

PO

- PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural science and engineering science.
- PO3: Design/Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal and environmental considerations.
- PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5: Modern tool usage: Choose select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- PO6: The Engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of and need for sustainable development.
- PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management practices and apply these to their own work, as a member and leader in a team to manage projects and multidisciplinary environments.
- PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOME

PSO

- PSO1: Have abilities to apply their knowledge in the domain of Electronics, Electrical Drives, Power Electronics and Transmission, Power Electronics and Control system for the benefits of the society and the Nation.
- PSO2: Have abilities to succeed with quality in national level competitive examinations for higher studies and employment.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

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Coimbatore - 641105

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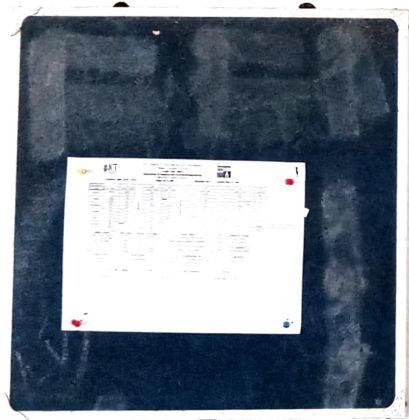
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COURSE INFORMATION SHEET

DEPARTMENT : ELECTRICAL AND ELECTRONICS ENGINEERING	PROGRAMME : B.E (EEE)
COURSE: Measurements & Instrumentation	SEMESTER: IV CREDITS: 3
COURSE CODE: C212 REGULATION: R2017	COURSE TYPE: CORE / ELECTIVE / BREADTH / S&H
COURSE AREA / DOMAIN: Electrical	CONTACT HOURS: 3 hours/Week
CORRESPONDING LAB COURSE CODE(IF ANY): Nil	LAB COURSE NAME (IF ANY): Nil

SYLLABUS:

UNIT	DETAILS	HOURS
	INTRODUCTION	
I	Functional elements of an instrument - Static and dynamic characteristics - Errors in measurement - Statistical evaluation of measurement data - Standards and calibration - Principle and types of analog and digital voltmeters, ammeters.	9
	ELECTRICAL AND ELECTRONIC INSTRUMENTS	
II	Principle and types of multi meters - Single and three phase watt meters and energy meters - Magnetic measurements - Determination of B-H curve and measurements of iron loss - Instrument transformers - Instruments for measurement of frequency and phase.	9
	COMPARATIVE METHODS OF MEASUREMENTS	
III	D.C potentiometers, D.C (Wheat stone, Kelvin and Kelvin Double bridge) & A.C bridges (Maxwell, Anderson and Schering bridges), transformer ratio bridges, self-balancing bridges. Interference & screening - Multiple earth and earth loops - Electrostatic and electromagnetic Interference -Grounding techniques.	9
	STORAGE AND DISPLAY DEVICES	
IV	Magnetic disk and tape - Recorders, digital plotters and printers, CRT display, digital CRO, LED, LCD & Dot matrix display - Data Loggers.	9
	TRANSDUCERS AND DATA ACQUISITION SYSTEMS	
V	Classification of transducers - Selection of transducers - Resistive, capacitive & inductive Transducers - Piezoelectric, Hall effect, optical and digital transducers - Elements of data acquisition system - Smart sensors-Thermal Imagers.	9
TOTAL HOURS		45 Periods

TEXT/REFERENCE BOOKS:

T / R	AUTHORS / BOOK TITLE / PUBLICATION
T	A.K. Sawhney, 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, 2010.
T	J. B. Gupta, 'A Course in Electronic and Electrical Measurements', S. K. Kataria & Sons, Delhi, 2013.
T	Doebelin E.O. and Manik D.N., Measurement Systems - Applications and Design, Special Indian Edition, McGraw Hill Education Pvt. Ltd., 2007.
R	H.S. Kalsi, 'Electronic Instrumentation', McGraw Hill, III Edition 2010.
R	D.V.S. Murthy, 'Transducers and Instrumentation', Prentice Hall of India Pvt Ltd, 2015.
R	David Bell, 'Electronic Instrumentation & Measurements', Oxford University Press, 2013.
R	Martin Reissland, 'Electrical Measurements', New Age International (P) Ltd., Delhi, 2001.
R	Alan. S. Morris, Principles of Measurements and Instrumentation, 2nd Edition, Prentice Hall of India, 2003.

COURSE PRE-REQUISITES:

C.CODE	COURSE NAME	DESCRIPTION	SEM
C103	Engineering Physics	Thermal Physics	I
C111	Physics for Electronic Engineering	Magnetic and Dielectric Properties of Materials	II

COURSE OBJECTIVES:

To impart knowledge on the following Topics:

1	Basic functional elements of instrumentation.
2	Fundamentals of electrical and electronic instruments.
3	Comparison between various measurement techniques.
4	Various storage and display devices.
5	Various transducers and the data acquisition systems.

COURSE OUTCOMES:

S.NO.	DESCRIPTION	Bloom's Taxonomy Level	PO(1..12) MAPPING	PSO(1..2) MAPPING
On completion of this course the students will be able to				
C212.1	Infer the Basic functional elements of instrumentation	Understand (level 2)	PO1 & PO2	-
C212.2	Understand the concepts of Fundamentals of electrical and electronic instruments	Understand (level 2)	PO1, PO2 & PO4	-
C212.3	Compare the various measurements techniques	Analyze (level 4)	PO1, PO3 & PO5	-
C212.4	Explain the Various storage and display devices	Understand (level 2)	PO1, PO12 & PSO2	PSO2
C212.5	Understand the concepts Various transducers and the data acquisition systems	Understand (level 2)	PO1, PO3, PO4, PO12 & PSO2	PSO2
COURSE OVERALL PO/PSO MAPPING: PO1, PO2, PO3, PO4, PO5, PO12 & PSO2				

COURSE OUTCOMES VS POs MAPPING (DETAILED; HIGH: 3; MEDIUM: 2; LOW: 1):

S.NO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C212.1	3	2												
C212.2	3	2		1										
C212.3	3		2		1									
C212.4	3											2		2
C212.5	3		1	1								2		2
C212*	3	2	1.5	1	1							2		2

* For Entire Course, PO & PSO Mapping

POs & PSO REFERENCE:

PO1	Engineering Knowledge	PO7	Environment & Sustainability	PSO1	Have abilities to apply their knowledge in the domain of Electronics, Electrical Drives, Power Generation and Transmission, Power Electronics and Control system for the benefits of the society and the Nation
PO2	Problem Analysis	PO8	Ethics	PSO2	Have abilities to successfully qualify in national level competitive examinations for higher studies and employment
PO3	Design & Development	PO9	Individual & Team Work		
PO4	Investigations	PO10	Communication Skills		
PO5	Modern Tools	PO11	Project Mgt. & Finance		
PO6	Engineer & Society	PO12	Life Long Learning		

COs VS POs/PSOs MAPPING JUSTIFICATION:

S.NO	PO/PSO MAPPED	LEVEL OF MAPPING	JUSTIFICATION
C212.1	PO1	3	To understand the basic elements of Instrumentation
C212.1	PO2	2	To analysis the Statistical evaluation for Measuring Instruments
C212.2	PO1	3	To Understand the concepts of Fundamentals of electrical and electronic instruments
C212.2	PO2	2	To analysis the Iron loss in Magnetic Circuits
C212.2	PO4	1	To investigate the various measuring instrument like Multi meters, Energy Meters, Power Measuring Meters, CT & PT
C212.3	PO1	3	To Compare the various measurements techniques
C212.3	PO3	2	To design the various Bridges for Measuring AC & DC Quantities
C212.3	PO5	1	To use the Modern Tools for find the faults in Under Ground Cables.
C212.4	PO1	3	To Study the Various storage and display devices
C212.4	PO12	2	To learn the new invention in the data storage

C212.4	PSO2	2	To learn the Various storage and display devices, It is useful for national level competitive examinations for higher studies and employment
C212.5	PO1	3	To Understand the concepts Various transducers and the data acquisition systems
C212.5	PO3	1	To know the steps for selecting the Transducer for specified application.
C212.5	PO4	1	To investigate the Smart Sensors for Future Applications
C212.5	PO12	2	To learn the new invention in Smart Sensors & DAC
C212.5	PS02	2	To learn concepts of various transducers and the data acquisition systems, it is useful for national level competitive examinations for higher studies and employment

GAPS IN THE SYLLABUS - TO MEET INDUSTRY/PROFESSION REQUIREMENTS, POs & PSOs:

S.NO.	DESCRIPTION	PROPOSED ACTIONS
1	Chemical Sensors and Analytical Instruments	Guest Lecture

PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL ETC

TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:

1	Galvanometer
2	Bolometer
3	Measurement of Frequency using Bridge
4	Graphic Recorders
5	Modern DAC Systems

WEB SOURCE REFERENCES:

1.	https://www.academia.edu/27101504/static_characteristics_of_instruments_PPT
2.	https://www.slideshare.net/Nitians/instrument-transformer-ct-pt

3.	https://www.slideshare.net/tausique5/week-2-61208543
4.	https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=5&cad=rja&uact=8&ved=2ahUKEwjEsffDiO3mAhWCoOkKHc_8ADgQFjAEegQICRAC&url=https%3A%2F%2Fwww.researchgate.net%2Fprofile%2FDilip_Mathuria%2Fpublication%2F322852611_Data_Logger%2Flinks%2F5a72b95e0f7e9b20d48e31f6%2FData-Logger&usg=AOvVaw2AbPIPND-IkLDoqFppDH9c
5.	https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=6&ved=2ahUKEwi4qr6die3mAhUn4nMBHQH3DEsQFjAFegQIDBAC&url=http%3A%2F%2Fkevaljethi.yolasite.com%2Fresources%2FCopy%2520of%2520smart%2520sensor.ppt&usg=AOvVaw1LqDIRFFgnj7dzucy5PL_w
6.	https://www.powershow.com/view4/556e94ODIIO/TRANSDUCERS_VARIABLE_RESISTIVE_CAPACITIVE_INDUCTIVE_powerpoint_ppt_presentation
7.	https://prezi.com/-jihpaidn0qk/modern-digital-data-aquisition-system/
8.	https://www.google.com/search?sxsrf=ACYBGNR9KJP9mqNxsVmRFiY9BTAltI_2jA%3A1580142672835&ei=UBAvXtPKMtTbrQH03oi4Dg&q=wien+bridge+ppt&oq=wien+ppt&gs_l=psy-ab.1.2.0i7i30I7j0i30I2j0i7i5i30.145537.146859..153085...0.1..0.385.1149.2-3j1.....0....1..gws-wiz.....0i71j0i13.GJvo9wPcbxE
9.	https://www.google.com/search?sxsrf=ACYBGNRxQSRpcQdbkW2cUqHGOHWOPbYB0Q%3A1580142859327&ei=CxEvXqHUE4PFrQG8t5HICA&q=bolometer+ppt&oq=bolo+ppt&gs_l=psy-ab.1.1.0i7i30I5j0i30j0i8i10i30I2j0i8i30I2.151641.152421..155719...0.1..0.343.1060.2-3j1.....0....1..gws-wiz.....0i71.9sd0ONqqK7M
10	https://www.google.com/search?q=Galvanometer.ppt&sxsrf=ACYBGNSPkgWJBv6P6YJObBh2Dm6i9lhA:1580144161889&ei=IRYvXo3uNcngrQGr_oCIBA&start=0&sa=N&ved=2ahUKEwjNgtrbn6TnAhVJcCsKHSs_AEE4ChDy0wN6BAgLEc0&biw=1438&bih=689
11	https://www.youtube.com/watch?v=BSJu9jdbOM0

DELIVERY/INSTRUCTIONAL METHODOLOGIES:

<input checked="" type="checkbox"/> CHALK & TALK	<input checked="" type="checkbox"/> STUD. ASSIGNMENT	<input type="checkbox"/> WEB RESOURCES	<input type="checkbox"/> NPTEL/OTHERS
<input checked="" type="checkbox"/> LCD/SMART BOARDS	<input checked="" type="checkbox"/> STUD. SEMINARS	<input type="checkbox"/> ADD-ON COURSES	<input type="checkbox"/> WEBNIARS

ASSESSMENT METHODOLOGIES-DIRECT

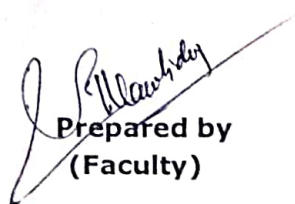
<input checked="" type="checkbox"/> ASSIGNMENTS	<input type="checkbox"/> STUD. SEMINARS	<input checked="" type="checkbox"/> TESTS/MODEL EXAMS	<input checked="" type="checkbox"/> UNIV. EXAMINATION
<input type="checkbox"/> STUD. LAB PRACTICES	<input type="checkbox"/> STUD. VIVA	<input type="checkbox"/> MINI/MAJOR PROJECTS	<input type="checkbox"/> CERTIFICATIONS
<input type="checkbox"/> ADD-ON COURSES	<input type="checkbox"/> OTHERS		

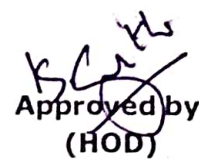
ASSESSMENT METHODOLOGIES-INDIRECT

<input checked="" type="checkbox"/> ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)	<input checked="" type="checkbox"/> STUDENT FEEDBACK ON FACULTY (TWICE)
<input type="checkbox"/> ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS	<input type="checkbox"/> OTHERS

INNOVATIONS IN TEACHING/LEARNING/EVALUATION PROCESSES:

1. Case Study
2. Activities (Group Discussion and Objective Type Test)
3. If learners are actively engaged with a task which they accept is for learning they are not simply follow a prescription or set of rules, but contribute their own thinking to the task.


Prepared by
(Faculty)


Approved by
(HOD)