



ST. XAVIER'S TECHNICAL INSTITUTE, MAHIM, MUMBAI 400 016
Diploma in Electronics and Telecommunication Engineering

Revised and Effective from July 2019			TEACHING AND EXAMINATION SCHEME										SEMESTER THREE					
Academic Year 2022-2023			Teaching Scheme				Examination Scheme											
Sr. No	Subject Title	Subject Code	TH	TU	PR	CRE DITS	PAP ER HRS	THEORY		PRACTIC AL		ONLINE		TERM WORK		TOTAL		
								Max	Min	Max	Min	Max	Min	Max	Min			
1	Applied Mathematics	ET-18311	3	1	xx	4	3	100	40	xx	xx	xx	xx	xx	xx	100		
2	Principles of Communication I*	ET-18312	4	xx	2	6	3	100	40	50	20	xx	xx	25	10	175		
3	Electronic Test Instruments	ET-18313	3	xx	2	5	3	100	40	50	20	xx	xx	25	10	175		
4	'C' Programming *	ET-18314	2	xx	4	6	xx	xx	xx	xx	xx	50	20	25	10	75		
5	Linear Integrated Circuits	ET-18315	4	xx	2	6	3	100	40	50	20	xx	xx	25	10	175		
6	Circuit Building I	ET-18319	xx	xx	4	4	xx	xx	xx	xx	xx	xx	xx	50	20	50		
7	Academic Skills	ET-18317	xx	xx	2	2	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx		
TOTAL			16	1	16	33		400		150		50		150		750		
*ET-18320 represents “Yoga” which is non-credit and non-exam in 3rd Semester of 2 hours per week																		
Total Number of Credits = 33, Total Number of Student Contact Hours = 35								Total Marks =										750
Abbreviations: 1)		TH	Theory		Note:		1) For progressive and continuous assessment two periodic tests of 20 marks each are for all the theory subjects. The average of these is added to the final theory examination marks, which is of 80 marks (except for online examinations). 2) All term work marks are Internal. 3) All practical exams/ oral are External and Internal.											
2)		TU	Tutorial															
3)		PR	Practical															
4)			No Theory Exam															
Prepared by Mr. Anil Gurav																		

* From academic year 2019-2020, PCOM-I TH credit increased from 3 to 4. C Programming Term work Marks reduced from 50 to 25. Yoga contact hours increased from 1 to 2 hrs/week. Sports And Cultural is removed and effective from July 2019.

Note:

From academic year 2019-2020,

- **PCOM-I TH credit increased from 3 to 4.**
- **C Programming Term work Marks reduced from 50 to 25**
- **Yoga contact hours increased from 1 to 2 hrs/week.**
- **Sports And Cultural is removed and effective from July 2019.**

All course codes changed from 153.....series to 183.....series from the academic year 2019-2020. Similar change will be made in the course codes in January 2020 for the fourth semester.

PROGRAMME TITLE: Diploma in Electronics & Telecomm. Engineering
SEMESTER : Three

Course Code	Course Title	Credits			Examination Scheme					
		L	T U	Total	Theory		P R	OR	T W	Total
					T H	TS				
ET 18311	APPLIED MATHEMATICS	3	1	4	80	20	-	-	-	100
1) Theory paper duration 3 hrs. 2) Theory paper assessment is Internal and External.										

RATIONALE:

This subject is classified under the Foundation Courses group and proceeds further to application levels of Mathematics to teach students the theory, concepts, principles of Applied Mathematics and the application, importance and use of mathematics in the analysis of concepts in electronics.

COURSE OUTCOMES & CO PO MAPPING

SEM III C 201	APPLIED MATHEMATICS (1ST COURSE IN SECOND YEAR)
C201.1	Evaluate integration of all types of functions.
C201.2	Use appropriate method and properties of integrals to evaluate problems.
C201.3	Solve First order first degree Differential Equations of various types.
C201.4	Calculate Average value ,R.M.S. value and Area between two curves using Definite integration.
C201.5	Apply Differential Equations for solving problems in Electronics Engineering field.
C201.6	Apply Laplace Transform to solve Differential Equations of First order with constant coefficient.

Mapping of Course outcomes (COs) to Program outcomes (POs)

SEM III C 201	APPLIED MATHEMATICS (1ST COURSE IN SECOND YEAR) PREPARED BY : SD									
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
C201.1	3	1								
C201.2	3	2			1					
C201.3	3	2			1					
C201.4	3	2			1					
C201.5	3	2			1					
C201.6	3	1			1					
C 201 TOTAL	18	10	00	00	05	00	00	00	00	00
CORRELATION LEVEL	3	2	0	0	1	0	0	0	0	0

TABLE TO DECIDE CORRELATION LEVELS

CO SUM TOTAL	06	12	18
CORRELATION LEVEL	1	2	3

CO SUM TOTAL	0, 1, 2	3, 4, 5, 6, 7, 8	9, 10, 11, 12, 13, 14	15, 16, 17, 18
CORRELATION LEVEL	0	1	2	3

Mrs. Sanchita Datta

Subject Expert

Sr. No.	Name of the Topic	Periods	Marks
01	INTEGRATION C201.1 C201.2 1.1 Integration of Standard functions 1.2 Integration by substitution 1.3 Standard integrals involving radicals and their square roots 1.4 Integration of the type $1/(ax^2 + bx + c)$ and $1/\sqrt{ax^2 + bx + c}$ 1.5 Integration of rational and irrational functions 1.6 Integration by partial fractions 1.7 Integration by trigonometric transformation 1.8 Integration by parts 1.9 Definite Integrations with all their properties (including $\int_0^{2a}$ and $\int_{-a}^a$ rules)	14	24
02	DIFFERENTIAL EQUATIONS C201.3 2.1 Definition of differential equation 2.2 Order and degree of differential equation 2.3 Formation of differential equation for function containing single constant 2.4 Solution of First order First degree differential equations - (i) variable separable, (ii) equations reducible to variable separable form (iii) homogeneous, (iv) exact and (v) linear	10	16
03	3.1 APPLICATIONS OF INTEGRATION C201.4 3.1.1 Area under the curve, Area between two curves 3.1.2 Mean value or Average value, RMS value 3.2 APPLICATIONS OF DIFFERENTIAL EQUATIONS C201.5 3.2.1 For solution of simple geometrical cases. 3.2.2 For solution of simple electrical/electronic circuits: LC, RC, RLC.	05 05	08 10

Sr. No.	Name of the Topic	Periods	Marks
04	LAPLACE TRANSFORMATION C201.6 4.1 Definition, Laplace transform of elementary functions 4.2 Important properties of Laplace Transforms – Linearity Property, the first shifting property, the second shifting property, change of scale property 4.3 Important results – multiplication by t^n and division by t (without proof) 4.4 Inverse Laplace Transform 4.5 Properties of inverse Laplace transform – (Linearity and First Shifting Property) 4.6 Inverse Laplace transform by partial fraction 4.7 Application of Laplace Transform for solving differential equations of first order with constant coefficient.	14	22

SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Chapter No.	Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
Section I						
1	Integration	14	04	16	04	24
2	Differential Equation	10	04	12	--	16
Section II						
3	Applications of Integration	05	--	04	04	08
4	Applications of Differential Equation	05	--	04	06	10
5	Laplace Transformation	14	04	08	10	22
Total		48	12	44	24	80

IMPLEMENTATION STRATEGY

1. Teaching plan
2. Minimum 10 Tutorials / assignments

REFERENCES

S. No.	Author	Title	Edition	Year of Publication	Publisher & Address
1	Sameer Shah	Applied Mathematics	3 rd	2012	TechMax Publications
2	Raval & Patel	Applied Mathematics	2 nd Revised	2014	Nirali Publications
3	S. P. Deshpande	Mathematics for Polytechnic Students II	1 st Edition	2005	Pune Vidhyarthi Griha Prakashan
4	S. G. Chitale & N. A. Joshi	A new approach to mathematics and statistics (Sc. Paper II)	9 th	1998	Sheth Publishers Pvt. Ltd. Mumbai
5	H. K. Dass	Engineering Mathematics	1 st	2003	S. Chand & Company Ltd. New Delhi

E-REFERENCES

<https://www.cuemath.com/calculus/integration/>
<https://math24.net/average-value-function.html>
<https://en.wikipedia.org/wiki/>
<https://www.toppr.com/guides/maths/>

PROGRAMME TITLE : Diploma in Electronics & Telecom. Engineering
SEMESTER : Three

Course Code	Course Title	Credits			Examination Scheme					
		L	P	Total	Theory		PR	OR	TW	Total
					T H	T S				
ET 18312	PRINCIPLES OF COMMUNICATION I	4	2	6	80	20	50	-	25	175
1) Theory paper duration 3 hrs. 2) Theory paper assessment is Internal and External. 3) The assessment of Practical is Internal and External.										

RATIONALE:

As a Core Technology subject, this subject attempts to put forth the concepts and principles used in electronic telecommunication. Concepts such as modulation, side band transmission, radiation and propagation, reception and demodulation which are widely used in the field of analog communication are dealt with in this subject. Knowledge of basic electronic devices and circuits is a prerequisite for the learning of this subject.

COURSE OUTCOMES & CO PO MAPPING

SEM III C 202	PRINCIPLES OF COMMUNICATION – I (2 ND COURSE IN SECOND YEAR)
C202.1	Demonstrate the concept of modulation and demodulation
C202.2	Analyze circuits for AM /FM generation
C202.3	Analyze circuits for AM /FM reception
C202.4	Interpret the operation of AM/ FM transmitter and receiver.
C202.5	Demonstrate the procedure for RF/IF alignment in AM/FM receivers
C202.6	Analyze the concept and working of antennas

Mapping of Course outcomes (COs) to Program outcomes (POs)

SEM III C 202	PRINCIPLES OF COMMUNICATION – I (2 ND COURSE IN SECOND YEAR) PREPARED BY : SG									
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
C202.1	3	3	2	2				2	1	1
C202.2	1	3	3	2				1	1	1
C202.3	1	3	3	2				1	1	1
C202.4	1	3	3	2				1	1	1
C202.5	1	3	3	2				1	1	1
C202.6	1	3	2	2				1	1	1
C 202 TOTAL	08	18	16	12	00	00	00	07	06	06
CORRELATION LEVEL	1	3	3	2	0	0	0	1	1	1

TABLE TO DECIDE CORRELATION LEVELS

CO SUM TOTAL	06	12	18
CORRELATION LEVEL	1	2	3

CO SUM TOTAL	0, 1, 2	3, 4, 5, 6, 7, 8	9, 10, 11, 12, 13, 14	15, 16, 17, 18
CORRELATION LEVEL	0	1	2	3

Mrs. Surbhi G.

Subject Expert

Sr. No.	Name of the Topic	Periods	Marks
01	MODULATION C202.1 1.1 Block Diagram of Basic Communication system 1.2 Definition, need for modulation. 1.3 Types of modulation - AM, FM & PM. 1.4 Types of transmission modes – Simplex, half duplex and full duplex(only definition)	04	06
02	AMPLITUDE MODULATION C202.1 C202.2 C202.4 2.1 Definition, modulation index - importance, mathematical expression, waveforms in time domain 2.2 Frequency spectrum, Band width. 2.3 AM transmission Power, current calculations. 2.4 Numerical on above topics. 2.5 High level & low level modulation-Definition & Comparison. 2.6 Circuit diagram of collector modulated Class C amplifier - explanation. 2.7 AM transmitter -block diagram study.(High Level Transmitter).	12	14
03	D.S.B. GENERATION C202.1 C202.2 C202.4 3.1 Balanced modulator using FETs - Circuit diagram. 3.2 SSB generation - advantages & disadvantages. 3.2.1 Filter method – block Diagram Study. 3.2.2 Phase shift method - block Diagram Study.	04	06
04	FREQUENCY MODULATION C202.1 C202.2 C202.4 4.1 Definition, mathematical expression (no derivation) modulation index. 4.2 Frequency spectrum - features, Band width calculation using Carson's Rule, concept of noise triangle, pre-emphasis and De emphasis. 4.3 Numericals on above topics. 4.4 FM Modulator 4.4.1 Reactance modulator using FET 4.4.2 Varactor diode construction, working principle of varactor diode modulator. 4.5 Block diagram of FM transmitter - using 4.5.1 Direct method 4.5.2 Indirect method with AFC (Armstrong method) 4.6 Advantages & disadvantages of FM over AM	12	14


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Sr. No.	Name of the Topic	Periods	Marks
05	AM RADIO RECEIVERS: C202.3 C202.4 5.1 Tuned Radio Frequency (TRF) type – Block diagram study. 5.2 Superheterodyne type – Block diagram study, relative advantages. 5.3 RF amplifier stage – Circuit Diagram, Advantages, Image frequency & its rejection, Numericals on above topics 5.4 Mixer stage - Circuit Diagram ,types, separately excited & self excited type, Superheterodyne tracking 5.5 IF amplifier stage - Circuit Diagram, Choice IF, IF response , Circuit of typical IF stage and explanation 5.6 Detector stage - Circuit Diagram, Simple diode detector, Practical diode detector 5.7 AGC stage - Circuit Diagram, Need for AGC, Types - forward & reverse type with graph. 5.8 Specifications of radio receivers: Sensitivity, Selectivity, Fidelity; Experimental procedure to determine them.	16	20
06	FM RADIO RECEIVERS: C202.3 C202.4 C202.5 7.1 Block diagram of FM Radio receiver, Comparison with AM receiver 7.2 FM Demodulator stage 7.2.1 Foster Seeley discriminator 7.2.2 Ratio detector 7.2.3 FM detector using PLL 7.4 Amplitude limiter stage 7.5 Alignment of radio receivers: Need for alignment, RF & IF alignment	12	14
07	ANTENNAS USED IN RADIO RECEIVERS: C202.6 7.1 Need for antennas. 7.2 Definitions- Antenna, Power Gain, Beamwidth, Directivity. 7.3 Types of antennas - List. 7.4 Reflection coefficient, VSWR, Radiation Patterns.	04	06

LIST OF LABORATORY EXPERIENCES

1	Amplitude Modulation Using DSB –TC modulator	C202.2
2	DSB Modulator	C202.2
3	FM Modulator	C202.2
4	Identification and Tracing of the Mixer and IF stages	C202.3
5	Identification and Tracing of the Detector and Audio stages	C202.3
6	Voltage Analysis of Single Band AM Radio Receiver	C202.3
7	Voltage Analysis of FM Radio Receiver	C202.3
8	DSB – TC Demodulator	C202.4
9	DSB - SC Demodulator	C202.4
10	SSB - SC Demodulator	C202.4
11	Measure and plot Selectivity of AM Receiver	C202.4
12	Measure and plot Sensitivity of AM Receiver	C202.4
13	Measure and plot Fidelity of AM Receiver	C202.4
14	Fault Finding in Single Band AM Radio Receiver	C202.5
15	Fault Finding in Single Band FM Radio Receiver	C202.5

*Fault finding practicals are demo experiments which is an extra skill imparted in the laboratory and not covered in theory.

SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Chapter No.	Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
Section I						
1	MODULATION	4	6	---	----	6
2	AMPLITUDE MODULATION	12	4	6	4	14
3	D.S.B. GENERATION	4	-----	6	----	6
4	FREQUENCY MODULATION	12	4	6	4	14
Section II						
5	AM RADIO RECEIVERS	16	4	12	4	20
6	FM RADIO RECEIVERS	12	4	6	4	14
7	ANTENNAS USED IN RADIO RECEIVERS	4	---	6	---	6
Total		64	22	42	16	80

IMPLEMENTATION STRATEGY

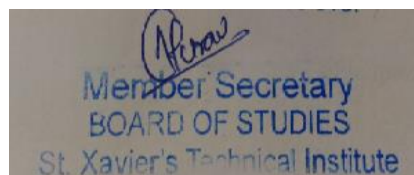
1. Teaching plan
2. Minimum 10 practicals

The table to measure the attainment levels for TERM WORK (on a rating scale of “out of 25”) of the defined expected course outcomes is as shown in the format given below:

(Note:.....the table should progress to the right for Lab Experience 7, 8, 9,and so on.....)

LAB EXPERIENCE		1	2	3	4	5	6
	COURSE OUTCOMES	C202.2 (out of 25)	C202.2 (out of 25)	C202.2 (out of 25)	C202.3 (out of 25)	C202.3 (out of 25)	C202.3 (out of 25)
STUDENT SPNO							
1303001							
1303002							
1303004							
1303005							
1303006							
1303008							
1303011							
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* The final % attainment level for TERM WORK of each course outcome may then be computed and the overall % attainment level for the course, for term work may then be calculated.



DETE SYLLABUS FOR THIRD SEMESTER – JULY 2022

The table to measure the attainment levels for PRACTICAL EXAMINATION (on a rating scale of “out of 50”) of the defined expected course outcomes is as shown in the format given below:

(Note:.....the table should progress to the right for Lab Experience 7, 8, 9,and so on.....)

LAB EXPERIENCE		1	2	3	4	5	6
	COURSE OUTCOMES	C202.2 (out of 50)	C202.2 (out of 50)	C202.2 (out of 50)	C202.3 (out of 50)	C202.3 (out of 50)	C202.3 (out of 50)
STUDENT SPNO							
1303001							
1303002							
1303004							
1303005							
1303006							
1303008							
1303011							
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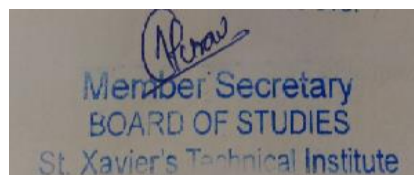
* The final % attainment level for PRACTICAL EXAMINATION of each course outcome may then be computed and the overall % attainment level for the course, for practical exam may then be calculated.

REFERENCES

Sr. No.	<u>Author</u>	<u>Title</u>	<u>Edition</u>	<u>Year of Publication</u>	Publisher & Address
1.	Wayne Tomasi	Elec. Comm. Systems	2 nd	1989	Pearson Education
2.	George Kenedy	Electronic communication systems	2 nd	1993	McGraw-Hill
4.	Dennis Roddy & John Coolen	Electronic communication	2 nd	1988	Prentice Hall of India Pvt. Ltd
3.	Gary M. Miller	Modern Electronic Communication	3 rd	1994	Prentice Hall of India Pvt. Ltd

E-REFERENCES

<https://en.wikipedia.org/wiki/Modulation>
https://en.wikipedia.org/wiki/Amplitude_modulation
https://en.wikipedia.org/wiki/Frequency_modulation
https://en.wikipedia.org/wiki/Radio_receiver



PROGRAMME TITLE : Diploma in Electronics & Telecom. Engineering
SEMESTER : Three

Course Code	Course Title	Credits			Examination Scheme					
		L	P	Total	Theory		PR	OR	TW	Total
					T H	T S				
ET 18313	ELECTRONIC TEST INSTRUMENTS	3	2	5	80	20	50	-	25	175
1) Theory paper duration 3 hrs. 2) Theory paper assessment is Internal and External. 3) The assessment of practical is Internal and External.										

RATIONALE:

Electronic measurements and instruments play an important role in the field of electronics. This subject is classified under Basic Technology group and intended to teach students principles of working, block diagrams and front panel controls of electronic instruments and their applications in the field of electronics. The prerequisite for this subject is knowledge of basic electronic devices and circuits.

COURSE OUTCOMES & CO PO MAPPING

SEM III C 203	ELECTRONIC TEST INSTRUMENTS (3 RD COURSE IN SECOND YEAR)
C203.1	Categorise the principle & operation of analog instruments.
C203.2	Distinguish different types of analog and digital meters.
C203.3	Compare the principle & operation of spectrum and logic analyzer
C203.4	Illustrate the principle & operation of waveform generators
C203.5	Classify the instrument for the measurement of specific electrical parameter.
C203.6	Demonstrate the procedure for fault finding in electronic systems

Mapping of Course outcomes (COs) to Program outcomes (POs)

SEM III C 203	ELECTRONIC TEST INSTRUMENTS (3 RD COURSE IN SECOND YEAR) PREPARED BY : AP									
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
C203.1		2	3		2		3	2	3	1
C203.2	1	2	3		2		3	1	2	1
C203.3		3	2	3	1		3	1	3	
C203.4		2	2	2	1		2	1	3	2
C203.5	1	2	2	1	3	3	2	1	2	1
C203.6	1	2	2	2	1	3	3	2	2	2
C 203 TOTAL	03	13	14	08	10	06	16	08	15	07
CORRELATION LEVEL	1	2	2	1	2	1	3	1	3	1

TABLE TO DECIDE CORRELATION LEVELS

CO SUM TOTAL	06	12	18
CORRELATION LEVEL	1	2	3

CO SUM TOTAL	0, 1, 2	3, 4, 5, 6, 7, 8	9, 10, 11, 12, 13, 14	15, 16, 17, 18
CORRELATION LEVEL	0	1	2	3

Mr. Abhijit Patil.

Subject Expert

Sr. No.	Name of the Topic	Periods	Marks
01	QUALITIES OF MEASUREMENTS, SIGNAL CONDITIONING AND PROCESSING C203.1 1.1 Static and dynamic characteristics of measurements. 1.2 Errors in measurements. 1.3 Standards for Electrical Tests and Measurements. 1.4 Primary and Secondary standards. 1.5 Sensors – PTC, NTC, Thermocouple, Analog Thermometer	07	12
02	CLASSIFICATION OF ANALOG INSTRUMENTS C203.1 2.1 Permanent Magnet Moving Coil (PMMC) Instruments 2.1.1 Dynamic meter movements (PMMC type) – construction, operation, advantages and disadvantages 2.2 Taut band type - construction, operation, advantages and disadvantages 2.3 Moving Iron instruments 2.3.1 Attraction type -Working Principle, construction, operation 2.3.2 Repulsion type -Working Principle, construction, operation 2.3.3 Comparison of the above two types. 2.3.4 Advantages & Disadvantages of Moving Iron Instruments. 2.4 Load Cells, LVDT	08	14
03	MULTIMETERS C203.2 3.1 PMMC meter. 3.1.1 Multi-range ammeter. 3.1.2 Voltmeter. 3.1.3 Ohm-meter (Calculations of Shunts and series resistors). 3.2 Electronic Voltmeters (EVM). 3.2.1 Special features. 3.2.2 Advantages over multi-meters. 3.2.3 Fields of applications. 3.3 Analog type EVM 3.3.1 Transistor type-circuit operation, Specifications. 3.3.2 FET type-circuit operation, specifications. 3.4 Digital type EVM 3.4.1 Operating principle. 3.4.2 Functional block diagram. 3.4.3 Specifications. 3.5 D.M.M. 3.5.1 Block diagram study. 3.5.2 Specifications. 3.5.3 Front panel controls. 3.6 Multi-turn Potentiometers, Trimmers	09	14


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Sr. No.	Name of the Topic	Periods	Marks
04	SPECTRUM & LOGIC ANALYZER C203.3 C203.5 4.1 Spectrum Analyzer. 4.1.1 Basic Spectrum Analyzer. 4.1.2 Superheterodyne type RF Spectrum Analyzer. 4.1.3 Real time Spectrum Analyzer. 4.1.4 Applications of Spectrum Analyzer. 4.2 Logic analyzer 4.2.1 Block diagram description 4.2.2 Applications 4.3 Difference between Spectrum & Logic Analyzer	08	14
05	WAVEFORM GENERATORS C203.4 C203.5 5.1 Functional block diagram with functions of each block, specifications and front panel controls of following generators: 5.1.1 Function generator. 5.1.2 Pattern generator. 5.1.3 Pulse generator.	07	12
06	ADDITIONAL TEST AND MEASURING INSTRUMENTS C203.5 C203.6 6.1 Basic concepts and use of 6.1.1 Maxwell's bridge. 6.1.2 Hay's bridge. 6.1.3 Frequency counter. 6.1.4 Wobuloscope. 6.2 Radiation Tests and Measurements: 6.2.1 Need, Principles, Methods and Applications 6.2.2 Equipment and Instruments used for the same 6.3 Servo Mechanism	09	14

LIST OF LABORATORY EXPERIENCES

1	Temperature Sensor P.T.C. Type	C203.1
2	Temperature Sensor N.T.C. Type	C203.1
3	Thermocouple	C203.1
4	Electronic Scale using Load Cell	C203.1
5	Linear Variable Differential Transducer	C203.1
6	FET Voltmeter	C203.4
7	Maxwell's bridge	C203.6
8	Hay's Bridge	C203.6
9	Multi-turn Potentiometers and Trimmers	C203.2
10	Resistance Calibration by Analog Thermometer	C203.1
11	Study of PMMC Meter	C203.2
12	Study of Function Generator	C203.5
13	Study of PID Controller	

* Study of PID Controller is a Demo Practical- which is an additional knowledge imparted in the laboratory and not covered in theory.

SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Chapter No.	Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
Section I						
1	QUALITIES OF MEASUREMENTS, SIGNAL CONDITIONING AND PROCESSING	07	04	04	04	12
2	CLASSIFICATION OF ANALOG INSTRUMENTS	08	04	06	04	14
3	MULTIMETERS	09	04	06	04	14
Section II						
4	SPECTRUM & LOGIC ANALYZER	16	04	06	04	14
5	WAVEFORM GENERATORS	12	04	04	04	12
6	ADDITIONAL TEST AND MEASURING INSTRUMENTS	4	04	06	04	14
Total		48	24	32	24	80

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IMPLEMENTATION STRATEGY

1. Teaching plan.
2. Presentations
3. Demonstrations.
4. Minimum 10 practicals /Assignments.

The table to measure the attainment levels for TERM WORK (on a rating scale of “out of 25”) of the defined expected course outcomes is as shown in the format given below:

(Note:.....the table should progress to the right for Lab Experience 7, 8, 9,and so on.....)

LAB EXPERIENCE		1	2	3	4	5	6
	COURSE OUTCOMES	C203.1 (out of 25)	C203.1 (out of 25)	C203.1 (out of 25)	C203.1 (out of 25)	C203.1 (out of 25)	C203.3 (out of 25)
STUDENT SPNO							
1303001							
1303002							
1303004							
1303005							
1303006							
1303008							
1303011							
.....							

* The final % attainment level for TERM WORK of each course outcome may then be computed and the overall % attainment level for the course, for term work may then be calculated.

The table to measure the attainment levels for PRACTICAL EXAMINATION (on a rating scale of “out of 50”) of the defined expected course outcomes is as shown in the format given below:

DETE SYLLABUS FOR THIRD SEMESTER – JULY 2022

(Note:.....the table should progress to the right for Lab Experience 7, 8, 9,and so on.....)

LAB EXPERIENCE		1	2	3	4	5	6
	COURSE OUTCOMES	C203.1 (out of 50)	C203.1 (out of 50)	C203.1 (out of 50)	C203.1 (out of 50)	C203.1 (out of 50)	C203.3 (out of 50)
STUDENT SPNO							
1303001							
1303002							
1303004							
1303005							
1303006							
1303008							
1303011							
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* The final % attainment level for PRACTICAL EXAMINATION of each course outcome may then be computed and the overall % attainment level for the course, for practical exam may then be calculated.

REFERENCES

Sr. No.	Author	Title	Edition	Year of Publication	Publisher & Address
1	H.S. Kalsi	Electronic Instrumentation	2 nd	2007	Tata Mc Graw Hill Pub. Co.Ltd; New Delhi.
2	A.K. Sawhney	A Course in Electrical & Electronics Measurements & Instrumentation	13 th	1996	Dhanpat Rai & Sons, Delhi.
3	William D. Cooper, Albert D. Helfrick	Modern Electronic Instrumentation and Measurement Techniques	3 rd	1992	Prentice Hall India, Delhi.

E-REFERENCES

<https://en.wikipedia.org/wiki>

<https://nitsri.ac.in/Department/Electronics>

https://www.iare.ac.in/sites/default/files/lecture_notes/

PROGRAMME TITLE : Diploma in Electronics & Telecom. Engineering
SEMESTER : Three

Course Code	Course Title	Credits			Examination Scheme					
		L	P	Total	Theory		Online Exam	OR	TW	Total
					T H	T S				
ET 18314	'C' PROGRAMMING	2	4	6			50	-	25	75
1) From academic year 2016-2017 there is no theory exam 2) The assessment of practical is Internal and External.										

RATIONALE :

This subject is classified under Basic Technology courses and intends to teach students concepts of programming, rules and syntax of 'C' language, arithmetic and logical operations in 'C' language, use of arrays, strings, functions, pointers, structures, unions and files in 'C' programming.

COURSE OUTCOMES & CO PO MAPPING

SEM III C 204	'C' PROGRAMMING (4 TH COURSE IN SECOND YEAR)
C204.1	Compare low level and high level programming language's.
C204.2	Analyse data types, expressions in C.
C204.3	Implement sequential, decision and iterative structures of programming language.
C204.4	Compose, Compile and debug programs using array and strings.
C204.5	Implement algorithms using functions & pointers.
C204.6	Solve computing problems related to structure.

Mapping of Course outcomes (COs) to Program outcomes (POs)

SEM III C 204	‘C’ PROGRAMMING (4 TH COURSE IN SECOND YEAR) PREPARED BY : RVG									
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
C204.1	1	2	3		1				1	1
C204.2	2	1	3		1				1	1
C204.3	1	1	3		1	1		1	1	1
C204.4	1	1	3		1			1	1	1
C204.5	2	2	3			1		1	1	1
C204.6	1	2	3			1		1	1	1
C 204 TOTAL	08	09	18	00	04	03	00	04	06	06
CORRELATION LEVEL	1	2	3	0	1	1	0	1	1	1

TABLE TO DECIDE CORRELATION LEVELS

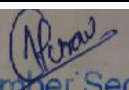
CO SUM TOTAL	06	12	18
CORRELATION LEVEL	1	2	3

CO SUM TOTAL	0, 1, 2	3, 4, 5, 6, 7, 8	9, 10, 11, 12, 13, 14	15, 16, 17, 18
CORRELATION LEVEL	0	1	2	3

Mr. R.V.Gheware.

Subject Expert

Sr. No.	Name of the Topic	Periods	Marks
01	CONCEPTS OF PROGRAMMING C204.1 1.1 Development of a Computer Program. Algorithm , Flowchart , 1.2 Low level language. (introduction) 1.3 Middle level language.(introduction) 1.4 High level language.(introduction)	02	06
02	BASICS OF C- PROGRAMMING C204.2 C204.1 2.1 Introduction to 'C'; History of 'C'. 2.2 Library types 2.3 Data types 2.4 Integer, Float, Character 2.5 Constants and Variables 2.6 keywords in c 2.7 Input , Output, scanf(), printf() 2.8 OPERATORS 2.8.1 Precedence and Associativity of operators 2.8.2 Expressions and their evaluation. 2.9 Exercises related to : Converting from Fahrenheit to Celsius. Largest and smallest of 'n' numbers.	06	14
03	CONTROL STRUCTURES & LOOPING STRUCTURE C204.3 3.1 IF 3.2 IF-ELSE 3.3 NESTED IF-ELSE 3.4 SWITCH 3.5 WHILE loop 3.6 DO-WHILE loop 3.7 FOR loop 3.8 Programs based on above topics	02	06
04	CONTROL STATEMENTS C204.3 4.1 goto 4.2 continue 4.3 break 4.4 Programs based on above topics	02	04
05	ARRAYS (one dimensional) C204.4 5.1 Defining, Declaring & Initialization. 5.2 Accepting data into Arrays. 5.3 Processing data in a Array. 5.4 Sorting of an Array. 5.5 Programs concerned with manipulating data in Array.	04	10


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Sr. No.	Name of the Topic	Periods	Marks
06	Functions C204.5 6.1 Function prototypes, passing arguments to a function by value and by reference, meaning of recursion. 6.2 Storage Classes, automatic, External, static, register variables in single file environment.	03	06
07	Arrays (Multi Dimensional) C204.4 C204.5 7.1 Definition & Declaration of multi-dimensional array, processing array, passing arrays to functions, 7.2 Initializing 2 Dimensional Array 7.3 Three Dimensional Array 7.4 Programs on the above	03	06
08	Pointers C204.4 C204.5 8.1 Declarations, Referencing and de-referencing, passing pointers to functions, 8.2 Pointer to array 8.3 Programs on the above topic	03	06
9	Strings C204.4 C204.5 9.1 Standard Library String Functions 9.2 Two Dimensional Array of character's. 9.3 Array of Pointers to strings 9.4 Limitations 9.5 Programs on the above topic	03	06
10	Structures C204.5 C204.6 10.1 Declaration of structure elements 10.2 Array of structure 10.3 Features of structures 10.4 Uses of structures 10.5 Programs on the above topic	04	08

LIST OF LABORATORY EXPERIENCES

1	Evaluation of Expressions in C	C204.1
2	Simple Elementary Programs	C204.2
3	Programs dealing with mathematical series	C204.3
4	Programs dealing with one dimension arrays	C204.4
5	Programs for two dimension arrays and sorting	C204.4
6	Programs dealing with strings	C204.4
7	Programs dealing with strings	C204.4
8	Programs concerned with functions and pointers	C204.5
9	Programs dealing with structures and files	C204.6
10	Programs dealing with structures and files	C204.6
11	Additional Program as given by teacher (general)	C204.3
12	Additional Program as given by teacher (arrays)	C204.4
13	Additional Program as given by teacher (strings)	C204.4
14	Additional Program as given by teacher (functions and pointers)	C204.5
15	Additional Program as given by teacher (structures and files)	C204.6

DETE SYLLABUS FOR THIRD SEMESTER – JULY 2022

The table to measure the attainment levels for TERM WORK (on a rating scale of “out of 25”) of the defined expected course outcomes is as shown in the format given below:

(Note:.....the table should progress to the right for Lab Experience 7, 8, 9,and so on.....)

LAB EXPERIENCE		1	2	3	4	5	6
	COURSE OUTCOMES	C204.1 (out of 50)	C204.2 (out of 50)	C204.3 (out of 50)	C204.4 (out of 50)	C204.4 (out of 50)	C204.4 (out of 50)
STUDENT SPNO							
1303001							
1303002							
1303004							
1303005							
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1303011							
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* The final % attainment level for TERM WORK of each course outcome may then be computed and the overall % attainment level for the course, for term work may then be calculated.

The table to measure the attainment levels for PRACTICAL EXAMINATION (on a rating scale of “out of 50”) of the defined expected course outcomes is as shown in the format given below:

(Note:.....the table should progress to the right for Lab Experience 7, 8, 9,and so on.....)

LAB EXPERIENCE		1	2	3	4	5	6
	COURSE OUTCOMES	C204.1 (out of 50)	C204.2 (out of 50)	C204.3 (out of 50)	C204.4 (out of 50)	C204.4 (out of 50)	C204.4 (out of 50)
STUDENT SPNO							
1303001							
1303002							
1303004							
1303005							
1303006							
1303008							
1303011							
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(Signature)
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St. Xavier's Technical Institute

DETE SYLLABUS FOR THIRD SEMESTER – JULY 2022

* The final % attainment level for PRACTICAL EXAMINATION of each course outcome may then be computed and the overall % attainment level for the course, for practical exam may then be calculated.

IMPLEMENTATION STRATEGY

1. Teaching plan
2. Minimum 10 practicals/assignments

REFERENCE BOOKS:

Sr. No.	Author	Title	Edition	Year of Publication	Publisher & Address
1.	Yashvant Kanetkar	Let us 'C'	7 th		BPB Publication New Delhi
2.	Bryan Kernighan and Dennis Ritchie	The 'C' Programming Language	2 nd	1995	Prentice Hall of India New Delhi
3.	Henry Mullish and Herbert Cooper	The Spirit Of 'C'	2 nd	1996	Jaico Publication Mumbai
4.	E. Balaguruswamy	Ansi 'C'	4 th		Tata MacGraw Hill

E-REFERENCE

http://learn.onlinegdb.com/c_for_beginners
<https://www.tutorialspoint.com/cprogramming/index.htm>
<https://www.programiz.com/c-programming>
https://www.youtube.com/results?search_query=c+programming+tutorials
<http://onlinegdb.com> (online compiler)

PROGRAMME TITLE : Diploma in Electronics & Telecom. Engineering
SEMESTER : Three

Course Code	Course Title	Credits			Examination Scheme					
		L	P	Total	Theory		PR	OR	TW	Total
					T H	T S				
ET 18315	LINEAR INTEGRATED CIRCUITS	4	2	6	80	20	50	-	25	175

- 1) Theory paper duration 3 hrs.
- 2) Theory paper assessment is Internal and External.
- 3) The assessment of practical is Internal and External.

RATIONALE:

Linear Integrated Circuits hold an important unique place in the field of electronics. This subject is classified under Basic Technology group with a focus on imparting concepts, principles and applications of Linear/Analog integrated circuits in the field of Electronics. The prerequisite for this subject is knowledge of basic electronic devices and circuits.

COURSE OUTCOMES & CO PO MAPPING

SEM III C 205	LINEAR INTEGRATED CIRCUITS (5TH COURSE IN SECOND YEAR)
C205.1	Analyze working of Op –Amp in Mathematical operations
C205.2	Analyze working of Op –Amp in linear and non-linear applications
C205.3	Demonstrate working principle of PLL and Develop electronics circuits using PLL
C205.4	Apply the knowledge of Voltage regulators in designing power supply
C205.5	Illustrate electronics circuits using timer IC555.

Mapping of Course outcomes (COs) to Program outcomes (POs)

SEM III C 205	LINEAR INTEGRATED CIRCUITS (5TH COURSE IN SECOND YEAR) PREPARED BY : SBG &VN									
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
C205.1	3	3	3	2	2	2	2	1	1	2
C205.2	3	3	3	3	3	2	2	2	2	2
C205.3	3	3	3	3	2	2	2	1	1	2
C205.4	3	3	3	3	3	2	2	2	1	2
C205.5	3	3	3	2	2	1	2	2	2	1
C 205 TOTAL	15	15	15	13	12	9	10	8	7	9
CORRELATION LEVEL	3	3	3	2	2	2	2	2	2	2

TABLE TO DECIDE CORRELATION LEVELS

CO SUM TOTAL	06	12	18
CORRELATION LEVEL	1	2	3

CO SUM TOTAL	0, 1, 2	3, 4, 5, 6, 7, 8	9, 10, 11, 12, 13, 14	15, 16, 17, 18
CORRELATION LEVEL	0	1	2	3

Dr. Shivaji Ghungrad

Mr. Vinay Naglikar.

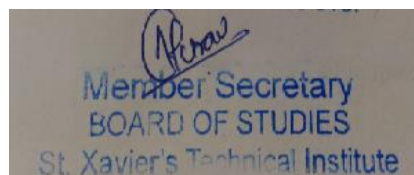
Subject Experts

Sr. No.	Name of the Topic	Periods	Marks
01	OP - AMPS: C 205.1 C205.2 1.1 Block diagram study of an op-amp. Parameters of op amp:- 741- Ideal parameters, definitions- Input offset voltage, Input offset current, Input Bias current, CMRR, PSRR, Slew Rate, Output voltage swing, Gain-Bandwidth product. 1.2 Op amp as a linear amplifier: - open & closed loop configurations, Virtual Ground Concept, Offset null adjustment, Transfer Characteristic. 1.3. Inverting , Non-inverting & differential configurations - Expressions of voltage Gain, Input resistance, output resistance & bandwidth for each and comparison. 1.4 Applications of inverting & non-inverting amplifiers as summing, scaling and averaging amplifier. 1.5 Op amp circuits for following mathematical applications: (i) Log and Antilog amplifier. (ii) Integrator and differentiator. 1.6 Applications as Voltage follower 1.7 Instrumentation Amplifier using 3 op amps - having fixed gain and variable gain..	16	20
02	TYPICAL OPAMP CIRCUITS C205.1, C205.2 2.1.OPAMP Sine Wave (L.F.) Oscillators: Operating principle, Circuit, operation and applications of Wien Bridge, and Phase Shift Oscillator 2.2 OPAMP Active Filters: (Simple Treatment) Low-Pass and High-Pass type First Order and Second Order Butterworth active filters. Comparison with passive filters. Advantages of employing the OPAMP in Active Filters. 2.3 Inverting and Non-Inverting Comparator, Zero crossing detector, Peak detector, Schmitt trigger. 2.4 V-I converter and I-V Converter, Sample and Hold circuit, Zero crossing detector,	16	20

	SECTION 2		
03	PHASE LOCKED LOOP (PLL) C205.3 3.1 Block diagram of VCO IC LM-566. 3.2 Working principle, functional block diagram and operation of PLL system. The PLL parameters - Lock-range, capture range, the transfer characteristics. 3.3 Block diagram study of PLL I.C. type 565. 3.4 Applications of PLL - F.M. Demodulator, Frequency Multiplier.	12	15
04	LINEAR AND SWITCHING VOLTAGE REGULATORS C205.4 4.1 Concepts of Voltage Regulation: Line, Load, Temperature stability, Ripple rejection. 4.2 The 3-Pin voltage Regulators: Structure and Operation, Advantage and limitations. The 78xx and 79xx I.C.s and their power supply circuits, the LM-317 I.C. Regulator and its power supply circuit. 4.3 Block diagram of switching voltage regulator. 4.4 Block diagram of an SMPS power Supply System, employing Controller I.C. type SG-3524.	12	15
05	TIMER I.C. TYPE NE-555 C205.5 5.1 Functional block diagram study and operation. 5.2 Operation in Monostable Mode. 5.3 Application as triggering circuit. 5.4 Operation in Astable Mode. 5.5 Application as square wave generator.	08	10

LIST OF LABORATORY EXPERIENCES

1	Inverting Amplifier	C205.1
2	Non Inverting Amplifier	C205.1
3	Differential Amplifier	C205.1
4	Integrator	C205.1
5	Differentiator	C205.1
6	Low Pass Filter	C205.2
7	High Pass Filter	C205.2
8	Monostable Multivibrator (Using IC-555)	C205.5
9	Astable MultiVibrator(Using IC- 741)	C205.1
10	Astable MultiVibrator(Using IC-555)	C205.5
11	7805 and 7905 Voltage regulator	C205.4



12	317 Voltage regulator	C205.4
13	Wien Bridge Oscillator	C205.2
14	Schmitt Trigger	C205.2
15	PLL 565 Parameters	C205.3

SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Chapter No.	Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
Section I						
1	OPAMPS	16	4	12	4	20
2	Typical OPAMPS Circuit	16	4	12	4	20
Section II						
3	Phase Locked Loop(PLL)	12	6	6	3	15
4	Linear and switching voltage regulators	12	6	6	3	15
5	TIMER IC type NE 555	08	4	4	2	10
Total		64	24	40	16	40

The table to measure the attainment levels for TERM WORK (on a rating scale of “out of 25”) of the defined expected course outcomes is as shown in the format given below:

(Note:.....the table should progress to the right for Lab Experience 7, 8, 9,and so on.....)

LAB EXPERIENCE		1	2	3	4	5	6
	COURSE OUTCOMES	C205.1 (out of 25)	C205.1 (out of 25)	C205.1 (out of 25)	C205.1 (out of 25)	C205.1 (out of 25)	C205.2 (out of 25)
STUDENT SPNO							
1303001							
1303002							
1303004							
1303005							
1303006							
1303008							
1303011							

* The final % attainment level for TERM WORK of each course outcome may then be computed and the overall % attainment level for the course, for term work may then be calculated.

(Signature)
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The table to measure the attainment levels for PRACTICAL EXAMINATION (on a rating scale of “out of 50”) of the defined expected course outcomes is as shown in the format given below:
(Note:.....the table should progress to the right for Lab Experience 7, 8, 9,and so on.....)

LAB EXPERIENCE		1	2	3	4	5	6
	COURSE OUTCOMES	C205.1 (out of 50)	C205.1 (out of 50)	C205.1 (out of 50)	C205.1 (out of 50)	C205.1 (out of 50)	C205.2 (out of 50)
STUDENT SPNO							
1303001							
1303002							
1303004							
1303005							
1303006							
1303008							
1303011							
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* The final % attainment level for PRACTICAL EXAMINATION of each course outcome may then be computed and the overall % attainment level for the course, for practical exam may then be calculated.

IMPLEMENTATION STRATEGY

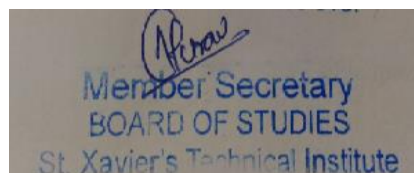
1. Teaching plan
2. Minimum 10 practicals / assignments

REFERENCES

Sr. No.	Author	Title	Edition	Year of Publication	Publisher & Address
1.	R. Gaikwad.	Operational Amplifiers	4th	1983	Prentice Hall
2.	J. Michael Jacob	Applications and Design with Analog Integrated Circuits	2nd	1993	Prentice Hall
3.	K.R. Botkar	Integrated Circuits	3 rd	1994	Khanna Publishers, N. Delhi

E-REFERENCES

<https://www.electronics-tutorials.ws>
<https://www.allaboutcircuits.com>
<https://www.analog.com>



PROGRAMME TITLE: Diploma in Electronics & Telecom. Engineering
SEMESTER : Three

Course Code	Course Title	Prerequisite	Credits			Examination Scheme					
			L	P	Total	Theory		PR	OR	TW	Total
						T H	T S				
ET 18319	CIRCUIT BUILDING I (No Theory exam)	-	-	4	4	-	-	-	-	50	50
The assessment of the Circuit Building I term work is Internal.											

RATIONALE:

The objective of this subject is to involve students in actual practical work of designing, constructing, designing and building circuits pertaining to linear integrated electronics on printed circuit boards. After completing the PCB layout design using relevant software, these circuits have to be built and tested for their performance, response and characteristics. This will enable the students to gain confidence with experience and the practical joy of building simple application based circuits with their implementation, so as to bring about a clear understanding of the working of these linear integrated circuits.

The details of activities and guidance concerned with the circuits to be constructed and tested by the students will be provided by the concerned teacher. The activities are designed in such a manner so as to provide maximum hands-on experiences and impart practical training and skills in circuit building and testing.

COURSE OUTCOMES & CO PO MAPPING

SEM III C 206	CIRCUIT BUILDING I (6 TH COURSE IN SECOND YEAR)
C206.1	Design, construct & test the Opamp as inverting & Non inverting amplifier
C206.2	Design, construct & test the Opamp as differentiator & integrator
C206.3	Design, construct & test the Opamp as Low Pass Filter & High Pass Filter
C206.4	Design, construct & test the Timer 555 as astable & monostable multivibrator

Mapping of Course outcomes (COs) to Program outcomes (POs)

SEM III C 206	CIRCUIT BUILDING I (6 TH COURSE IN SECOND YEAR) PREPARED BY : SD'									
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
C206.1	3	3	3	3	3			3		3
C206.2	3	3	3	3	3			3		3
C206.3	3	3	3	3	3			3		3
C206.4	3	3	3	3	3			3		3
C 206 TOTAL	12	12	12	12	12	00	00	12	00	12
CORRELATION LEVEL	3	3	3	3	3	0	0	3	0	3

TABLE TO DECIDE CORRELATION LEVELS

CO SUM TOTAL	06	12	18
CORRELATION LEVEL	1	2	3

CO SUM TOTAL	0, 1, 2	3, 4, 5, 6, 7, 8	9, 10, 11, 12, 13, 14	15, 16, 17, 18
CORRELATION LEVEL	0	1	2	3

Mr. Stevenson D'souza

Subject Expert

LIST OF LABORATORY EXPERIENCES

1	Inverting Amplifier	C206.1
2	Non Inverting Amplifier	C206.1
3	Differential Amplifier	C206.1
4	Integrator	C206.2
5	Differentiator	C206.2
6	Low Pass Filter	C206.3
7	High Pass Filter	C206.3
8	Monostable Multivibrator (Using IC-555)	C206.4
9	Astable MultiVibrator(Using IC- 741)	C206.4
10	Astable MultiVibrator(Using IC-555)	C206.4
11		
12		
13		
14		
15		

DETE SYLLABUS FOR THIRD SEMESTER – JULY 2022

The table to measure the attainment levels for TERM WORK (on a rating scale of “out of 25”) of the defined expected course outcomes is as shown in the format given below:

(Note:.....the table should progress to the right for Lab Experience 7, 8, 9,and so on.....)

LAB EXPERIENCE		1	2	3	4	5	6
	COURSE OUTCOMES	C206.1 (out of 50)	C206.1 (out of 50)	C206.1 (out of 50)	C206.2 (out of 50)	C206.2 (out of 50)	C206.3 (out of 50)
STUDENT SPNO							
1303001							
1303002							
1303004							
1303005							
1303006							
1303008							
1303011							
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* The final % attainment level for TERM WORK of each course outcome may then be computed and the overall % attainment level for the course, for term work may then be calculated.