ST. Xavier's Technical Institute,
Mahim, Mumbai 400 016

Revised Curriculum
For
Diploma Programme in Electronics and Telecommunication Engineering

From July 2020

Dr. Shivaji Ghungrad
PRINCIPAL
St. Xavier's Technical Institute
Mahim, Mumbai - 400 016.

DIPTI MESTRY
Controller of Examinations
St. Xavier's Technical Institute
Mahim, Mumbai - 400 016.

CHAIRMAN
BOARD OF STUDIES
St. Xavier's Technical Institute

Member Secretary
BOARD OF STUDIES
St. Xavier's Technical Institute

ST. Xavier's Technical Institute, Mahim, Mumbai 400 016

Diploma Programme in Electronics and Telecommunication Engineering

Programme Structure

Programme Educational Objectives (PEO)
(*What the student will continue to do even after 3-5 years of working in the industry*)

PEO1: To produce diploma holders who have the ability to demonstrate technical competence in the fields of Electronics and Telecommunication engineering and develop solutions to the problems.

PEO2: To produce diploma holders who would be able to take individual responsibility and to work as a part of a team towards the fulfillment of both individual and organizational goals.

PEO3: To prepare the students to engage in professional development through self-study, graduate and professional studies in engineering, management and research.

Program Outcomes (PO) given by NBA.
(*What the student will be able to do at the entry point of industry soon after diploma programme*)

NO.	PO Statement
PO1	Apply knowledge of mathematics and engineering to solve problems in Electronics and Telecommunication Engineering.
PO2	Employ necessary techniques, hardware and software tools for modern engineering applications.
PO3	Demonstrate basic engineering practices and conduct experiments in electronics, electrical system and in programming language.
PO4	Model and simulate communication systems and analyse the performance using modern tools.
PO5	Solve problems through analytical thinking to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering practice.
PO6	Follow and contribute to the developments in their own field, within realistic constraints such as economic, social, ethical, environmental and sustainability.
PO7	Have strong ethical and professional responsibility and adherence to quality.

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PO8 Work as a member of a project team to find cost effective design solutions to problems related to electronics and communication systems.

PO9 Communicate effectively in both verbal and written forms

PO10 Appreciate technological change and the need for independent life-long learning.

Program Specific Outcomes (PSOs)

(*What the student will be able to do in the Electronics and Telecommunication engineering specific industry soon after the diploma programme*)

PSO 1. Design, verify and validate electronic functional elements for a variety of applications, with skills to interpret and communicate results.

PSO 2. Exercise good programming practices employing low or high level languages on appropriate platforms.

Note for All the Semesters :

1. Every student has to separately pass in End-Semester-Examination (ESE) for both theory and practical by securing minimum of 40% marks, (i.e. 32 out of 80, 20 out of 50, and 10 out of 25).

2. Progressive Assessment (PA) for Theory includes Written Exam – average of two PTs of 20 marks each. Progressive Assessment (PA) for Practical includes lab performance /micro projects/ Assignment/Quiz/Presentations/attendance according to the nature of the course. The scheme and schedule for progressive assessment should be informed to the students and discussed with them at the start of the term.

3. For developing self-directed learning skills, from each course about 15-20% of the topics/sub-topics, which are relatively simpler or descriptive in nature are to be given to the students for self-study and proper learning of these topics should be assured through classroom presentations by students.

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

REVISED AND EFFECTIVE FROM JULY 2018	TEACHING AND EXAMINATION SCHEME	SEMESTER ONE

ACADEMIC YEAR 2020-21		TEACHING SCHEME					EXAMINATION SCHEME				
SR.NO	SUBJECT TITLE	SUBJECT CODE	TH	TU	PR	CREDITS	THEORY		PRACTICAL / ORAL		GRAND TOTAL
							ESA	PA	ESA	PA	
1	Basic Mathematics	ET-18111	4	1	XX	5	80	20	XX	XX	100
2	Basic Electronics	ET-18121	4	XX	4	8	80	20	50	25	175
3	Basic Electrical Engineering	ET-18113	4	XX	2	6	80	20	50	25	175
4	Computer Applications	ET-18115	XX	XX	2	2	XX	XX	50 (ONLINE EXAM)	25	75
5	Electronic Materials & Components	ET-18116	2	2	XX	4	XX	XX	50 (ONLINE EXAM)	50	100
6	Professional Practices	ET-18117	2	XX	XX	2	XX	XX	XX	50	50
7	English Language	ET-18118	4	XX	2	6	80	20	XX	50	150
		Total	20	3	10	33	320	80	200	225	825

ET-18120 represents "Yoga" which is Non-Credit and Non-Exam in First Semester of 1 Hour/ Week

Total Number of Credits = 33 , Total Number of Student Contact Hours = 34 — Total Marks = 825

Abbreviations		
	TH	Theory
	TU	Tutorial
	PR	Practical
	XX	No TW/EXAM(TH/PR/OR/ Online)
	ESA	End Semester Exam
	PA	Progressive assessment

- 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 70 marks (except for online examinations).
- All term work marks are Internal.
- All practical exams/ oral are External and Internal .
- All online exams are Internal

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

REVISED AND EFFECTIVE FROM JANUARY 2019	TEACHING AND EXAMINATION SCHEME	SEMESTER TWO

ACADEMIC YEAR 2020-21		TEACHING SCHEME					EXAMINATION SCHEME				
SR.NO	SUBJECT TITLE	SUBJECT CODE	TH	TU	PR	CREDITS	THEORY		PRACTICAL / ORAL		GRAND TOTAL
							ESA	PA	ESA	PA	
1	Engineering Mathematics	ET-18211	3	1	xx	4	80	20	xx	xx	100
2	Applied Electronics	ET-18222	3	xx	4	7	80	20	50	25	175
3	Electronic Circuits & Applications	ET-18223	3	xx	4	7	80	20	50	25	175
4	Engg. Drawing & C.A.D.	ET-18215	xx	xx	2	2	xx	xx	**50**	25	75
5	Electrical Machines	ET-18216	3	xx	2	5	80	20	50	25	175
6	Electronics Workshop	ET-18217	xx	xx	2	2	xx	xx	xx	50	50
7	Environmental Science *	ET-18219	2	xx	2	4	xx	xx	(Online exam) 100	50	**150**
8	Communication Skills	ET-18224	2	2	xx	4	xx	xx	xx	50	**50**
		Total	**16**	**3**	**16**	**35**	**320**	**80**	**300**	**250**	**950**

Total Number of Credits = 35, Total Number of Student Contact Hours = 35 — **Total Marks = 950**

Abbreviations		
	TH	Theory
	TU	Tutorial
	PR	Practical
	XX	No TW/EXAM(TH/PR/OR/ Online)
	ESA	End Semester Exam
	PA	Progressive assessment

- **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 70 marks (except for online examinations).**
- **All term work marks are Internal.**
- **All practical exams/ oral are External and Internal .**
- **All online exams are Internal**

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Diploma in Electronics & Telecommunication Engineering

REVISED AND EFFECTIVE FROM JULY 2019	TEACHING AND EXAMINATION SCHEME	SEMESTER THREE

ACADEMIC YEAR 2020-21		TEACHING SCHEME					EXAMINATION SCHEME				
SR.NO	SUBJECT TITLE	SUBJECT CODE	TH	TU	PR	CREDITS	THEORY		PRACTICAL / ORAL		GRAND TOTAL
							ESA	PA	ESA	PA	
1	Applied Mathematics	ET-18311	3	1	xx	4	80	20	xx	xx	100
2	Principles of Communication I*	ET-18312	4	xx	2	6	80	20	50	25	175
3	Electronic Test Instruments	ET-18313	3	xx	2	5	80	20	50	25	175
4	'C' Programming *	ET-18314	2	xx	4	6	xx	xx	50	25	75
5	Linear Integrated Circuits	ET-18315	4	xx	2	6	80	20	50	25	175
6	Circuit Building I	ET-18319	xx	xx	4	4	xx	xx	xx	50	50
7	Academic Skills	ET-18317	xx	xx	2	2	xx	xx	xx	xx	xx
		Total	16	1	16	33	320	80	200	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		
	TH	Theory
	TU	Tutorial
	PR	Practical
	XX	No TW/EXAM(TH/PR/OR/ Online)
	ESA	End Semester Exam
	PA	Progressive assessment

- 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 70 marks (except for online examinations).
- All term work marks are Internal.
- All practical exams/ oral are External and Internal .
- All online exams are Internal

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REVISED AND EFFECTIVE FROM JANUARY2020	TEACHING AND EXAMINATION SCHEME	SEMESTER FOUR

ACADEMIC YEAR 2020-21		TEACHING SCHEME					EXAMINATION SCHEME				
SR.NO	SUBJECT TITLE	SUBJECT CODE	TH	TU	PR	CREDITS	THEORY		PRACTICAL / ORAL		GRAND TOTAL
							ESA	PA	ESA	PA	
1	Entrepreneurship	ET-18411	3	xx	2	5	xx	xx	(Online exam) 50	50	100
2	Principles of Communication II	ET-18412	3	xx	2	5	80	20	50	25	175
3	Digital Electronics	ET-18413	3	xx	2	5	80	20	50	25	175
4	Circuits and Networks	ET-18415	3	xx	2	5	80	20	50	25	175
5	Software Simulation Techniques	ET-18416	xx	xx	2	2	xx	xx	xx	50	50
6	Circuit Building II	ET-18419	xx	xx	4	4	xx	xx	xx	50	50
7	Industrial Electronics	ET-18420	3	xx	2	5	80	20	50	25	175
8	Academic Skills	ET-18421	xx	xx	2	2	xx	xx	xx	xx	xx
		Total	15	0	18	33	320	80	250	250	900

ET-18423 represents Sports And Cultural which is non-credit and non-exam in 4th Semester of 2 hours/week

Total Number of Credits = 33, Total Number of Student Contact Hours = 35 — **Total Marks = 900**

Abbreviations		
	TH	Theory
	TU	Tutorial
	PR	Practical
	X	No TW/EXAM(TH/PR/OR/ Online)
	ESA	End Semester Exam
	PA	Progressive assessment

- **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 70 marks (except for online examinations).**
- **All term work marks are Internal.**
- **All practical exams/ oral are External and Internal .**
- **All online exams are Internal**

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REVISED AND EFFECTIVE FROM JULY 2020	TEACHING AND EXAMINATION SCHEME	SEMESTER FIVE

ACADEMIC YEAR 2020-21		TEACHING SCHEME				EXAMINATION SCHEME				
SR.NO	SUBJECT TITLE	SUBJECT CODE	TH	TU	PR	CREDITS	THEORY		PRACTICAL / ORAL		GRAND TOTAL
							ESA	PA	ESA	PA	
1	Microprocessors and Microcontrollers	ET-18519	4	xx	2	6	80	20	50	25	175
2	Signals and Systems	ET-18512	3	1	2	6	80	20	50	25	175
3	Advanced Communication Systems	ET-18513	4	xx	2	6	80	20	50	25	175
4	Project I	ET-18514	xx	xx	2	2	xx	xx	xx	50	50
5	Basic Control Systems (E1)	ET-18520	4	xx	2	6	80	20	50	25	175
6	Vocational Training	ET-18516	xx	xx	6	(4+2)=6	xx	xx	50	50	100
7	Circuit Simulation and PCB Design	ET-18517	xx	xx	2	2	xx	xx	50	25	75
8	PLC Systems and Applications (E1)	ET-18518	4	xx	2	6	80	20	50	25	175
		Total	15	1	18	34	320	80	300	225	925

Total Number of Credits, Student Contact Hours = 34	Total Marks =	925

Abbreviations		
	TH	Theory
	TU	Tutorial
	PR	Practical
	XX	No TW/EXAM(TH/PR/OR/ Online)
	ESA	End Semester Exam
	PA	Progressive assessment
	E1	Elective One

- 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 70 marks (except for online examinations).
- All term work marks are Internal.
- All practical exams/ oral are External and Internal .
- All online exams are Internal

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REVISED AND EFFECTIVE FROM JANUARY 2021	TEACHING AND EXAMINATION SCHEME	SEMESTER SIX
ACADEMIC YEAR 2020-21	TEACHING SCHEME	EXAMINATION SCHEME

SR.NO	SUBJECT TITLE	SUBJECT CODE	TH	TU	PR	CREDITS	THEORY		PRACTICAL / ORAL		GRAND TOTAL
							ESA	PA	ESA	PA	
1	Mobile Communication(E2)	ET-18611	4	xx	2	6	80	20	50	25	175
2	Digital Signal Processing	ET-18612	3	1	2	6	80	20	50	25	175
3	Data Commn. & Comp. Networking(E2)	ET-18613	4	xx	2	6	80	20	50	25	175
4	Digital Communication	ET-18614	4	xx	2	6	80	20	50	25	175
5	Mechatronics(E3)	ET-18619	4	xx	2	6	80	20	50	25	175
6	Project II	ET-18616	xx	xx	4	4	xx	xx	50	50	100
7	Advanced Power Electronics (E3)	ET-18617	4	xx	2	6	80	20	50	25	175
8	Scilab	ET-18618	xx	xx	2	2	xx	xx	xx	50	50
9	Industrial Management and Quality Control (IMQC)	ET-18620	3	xx	xx	3	80	20	xx	xx	100
10	Technical Writing	ET-18621	xx	xx	2	2	xx	xx	xx	50	50
		Total	18	1	16	35	400	100	250	250	1000

Total Number of Credits, Student Contact Hours = 35 — Total Marks = 1000

Abbreviations			
		TH	Theory
		TU	Tutorial
		PR	Practical
		XX	No TW/EXAM(TH/PR/OR/ Online)
E2, E3	Elective Two and Three	ESA	End Semester Exam
		PA	Progressive assessment

- 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 70 marks (except for online examinations).
- All term work marks are Internal.
- All practical exams/ oral are External and Internal .
- All online exams are Internal

ST. XAVIER'S TECHNICAL INSTITUTE, MAHIM, MUMBAI 400 016
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REVISED AND EFFECTIVE FROM JULY 2018	SUMMARY OF TEACHING / WEEK, CREDITS AND EXAMINATION SCHEME	SEMESTER ONE - SIX

ACADEMIC YEAR 2020-21		TEACHING SCHEME				EXAMINATION SCHEME				
SR.NO	SUBJECT TITLE	TH	TU	PR	CREDITS	THEORY		PRACTICAL / ORAL		GRAND TOTAL
						ESA	PA	ESA	PA	
1	Semester -- 1	20	3	10	33	320	80	200	225	825
2	Semester -- 2	16	3	16	35	320	80	300	250	950
3	Semester -- 3	16	1	16	33	320	80	200	150	750
4	Semester -- 4	15	1	18	34	320	80	300	225	925
5	Semester -- 5	15	1	18	34	320	80	300	225	925
6	Semester -- 6	18	1	16	35	400	100	250	250	1000
Total		100	10	94	204	2000	500	1550	1325	5375

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Diploma in Electronics and Telecommunication Engineering

Revised and Effective from July 2019	**TEACHING AND EXAMINATION SCHEME**	**SEMESTER THREE**
Academic Year 2020-2021		

Sr. No	**Subject Title**	**Subject Code**	**Teaching Scheme**				**Examination Scheme**									
			TH	**TU**	**PR**	**CREDITS**	**PAPER HRS**	**THEORY**		**PRACTICAL**		**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
2)	TU	Tutorial
3)	PR	Practical
4)		No Theory Exam

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.

Prepared by Mrs. Janani Natarajan

*** 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					
					Theory					
		L	T U	Total	T H	TS	P R	OR	T W	Total
ET 18311	APPLIED MATHEMATICS	3	1	4	80	20	-	-	-	100

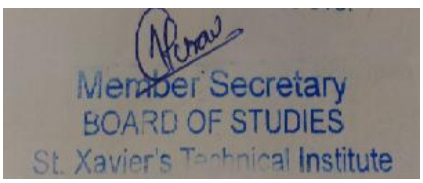
1) Theory paper duration 3 hrs.
2) Theory paper assessment is Internal and External.

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

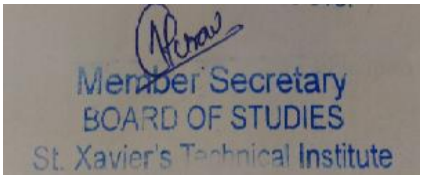
TABLE TO DECIDE CORRELATION LEVELS

CO SUM TOTAL	06	12	18
CORRELATION LEVEL	1	2	3

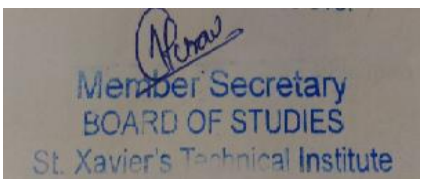
CO SUM TOTAL	0, 1, 2	3, 4, 5, 6, 7, 8	9, 10, 11, 12, 13, 14	15, 16, 17, 18
CORRELATION LEVEL	0	1	2	3

Mrs. Sanchita Datta

Subject Expert



Sr. No.	Name of the Topic	Periods	Marks
	SECTION 1		
01	**INTEGRATION** **C201.1** **C201.2** 1.1 Integration of Standard functions 1.2 Integration by substitution 1.3Standard 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
	SECTION 2		
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	05	08
	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	10



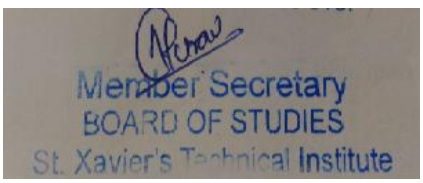
Sr. No.	Name of the Topic	Periods	Marks
04	**LAPLACE TRANSFORMATION C201.6** 4.1 Definition, Laplace transform of elementary functions 4.2 Important properties of Laplace Transforms – Linearity Property, the first shifting property, the second shifting property, change of scale property 4.3 Important 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

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	3rd	2012	TechMax Publications
2	Raval & Patel	Applied Mathematics	2nd Revised	2014	Nirali Publications
3	S. P. Deshpande	Mathematics for Polytechnic Students II	1st Edition	2005	Pune Vidhyarthi Griha Prakashan
4	S. G. Chitale & N. A. Joshi	A new approach to mathematics and statistics (Sc. Paper II)	9th	1998	Sheth Publishers Pvt. Ltd. Mumbai
5	H. K. Dass	Engineering Mathematics	1st	2003	S. Chand & Company Ltd. New Delhi



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

Course Code	Course Title	Credits			Examination Scheme					
					Theory		PR	OR	TW	Total
		L	P	Total	TH	TS				
ET 18312	PRINCIPLES OF COMMUNICATION - I	4	2	6	80	20	50	-	25	175

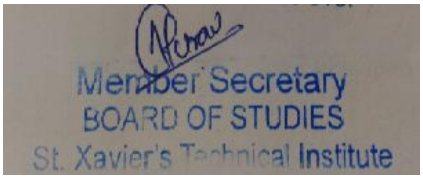
1) Theory paper duration 3 hrs.
2) Theory paper assessment is Internal and External.
3) The assessment of Practical is Internal and External.

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

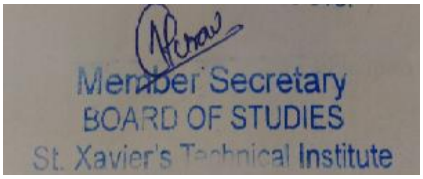
TABLE TO DECIDE CORRELATION LEVELS

CO SUM TOTAL	06	12	18
CORRELATION LEVEL	1	2	3

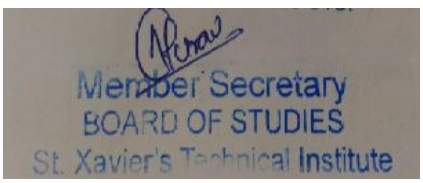
CO SUM TOTAL	0, 1, 2	3, 4, 5, 6, 7, 8	9, 10, 11, 12, 13, 14	15, 16, 17, 18
CORRELATION LEVEL	0	1	2	3

Mrs. Surbhi G.

Subject Expert



SECTION 1			
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

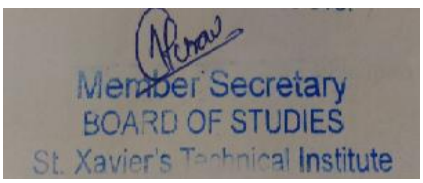


SECTION 2			
Sr. No.	Name of the Topic	Periods	Marks
05	**AM RADIO RECEIVERS**: **C202.3 C202.4** 5.1 Tuned Radio Frequency (TRF) type – Block diagram study. 5.2 Superheterodyne type – Block diagram study, relative advantages. 5.3 RF amplifier stage – Circuit Diagram, Advantages, Image frequency & its 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. 7.3Types of antennas - List. 7.4 Reflection coefficient, VSWR, Radiation Patterns.	04	06

LIST OF LABORATORY EXPERIENCES

EXP. NO.	TITLE	COURSE OUTCOME MAPPING
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.



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							
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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.

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St. Xavier's Technical Institute

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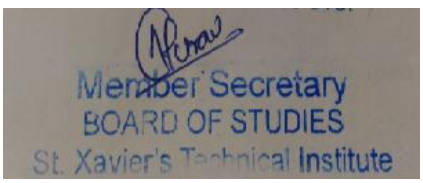
* The final % attainment level for PRACTICAL EXAMINATION of each course outcome may then be computed and the overall % attainment level for the course, for practical exam may then be calculated.

REFERENCES

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



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

Course Code	Course Title	Credits			Examination Scheme					
					Theory		PR	OR	TW	Total
		L	P	Total	TH	TS				
ET 18313	ELECTRONIC TEST INSTRUMENTS	3	2	5	80	20	50	-	25	175

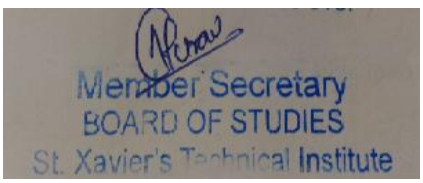
1) Theory paper duration 3 hrs.
2) Theory paper assessment is Internal and External.
3) The assessment of practical is Internal and External.

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

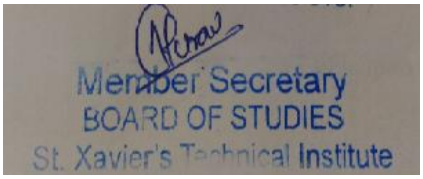
TABLE TO DECIDE CORRELATION LEVELS

CO SUM TOTAL	06	12	18
CORRELATION LEVEL	1	2	3

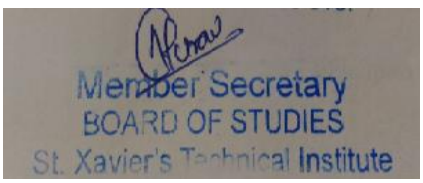
CO SUM TOTAL	0, 1, 2	3, 4, 5, 6, 7, 8	9, 10, 11, 12, 13, 14	15, 16, 17, 18
CORRELATION LEVEL	0	1	2	3

Mr. Abhijit Patil.

Subject Expert



SECTION 1			
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



SECTION 2			
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

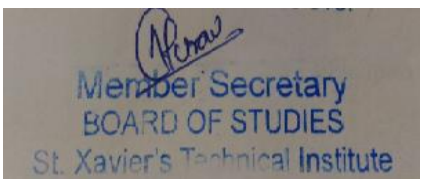
LIST OF LABORATORY EXPERIENCES

EXP. NO.	TITLE	COURSE OUTCOME MAPPING
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	
14		
15		

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

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							
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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	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)
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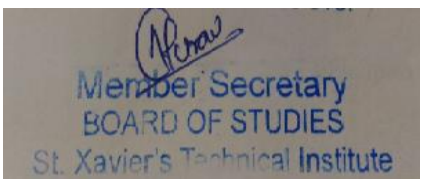

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* The final % attainment level for PRACTICAL EXAMINATION of each course outcome may then be computed and the overall % attainment level for the course, for practical exam may then be calculated.

REFERENCES

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

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

Course Code	Course Title	Credits			Examination Scheme					
					Theory		Online Exam	OR	TW	Total
		L	P	Total	TH	TS				
ET 18314	'C' PROGRAMMING	2	4	6			50	-	25	75

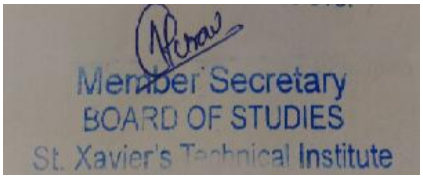
1) From academic year 2016-2017 there is no theory exam
2) The assessment of practical is Internal and External.

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

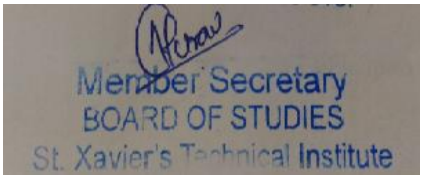
TABLE TO DECIDE CORRELATION LEVELS

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

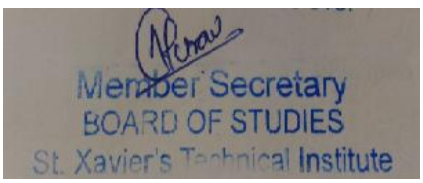
Mr. R.V.Gheware.

Subject Expert

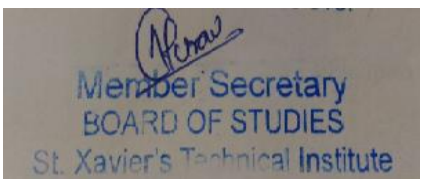


SECTION 1			
Sr. No.	Name of the Topic	Periods	Marks
01	**CONCEPTS OF PROGRAMMING C204.1** 1.1 Development of a Computer Program. Algorithm , Flowchart , 1.2 Low level language. (introduction) 1.3 Middle level language.(introduction) 1.4 High level language.(introduction)	02	06
02	**BASICS OF C- PROGRAMMING 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.	04	10

	5.5 Programs concerned with manipulating data in Array.		

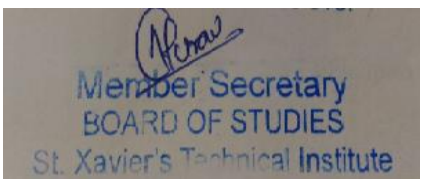


SECTION 2			
06	**Functions C204.5** 6.1 Function prototypes, passing arguments to a function by value and by reference, meaning of recursion. 6.2 Storage Classes, automatic, External, static, register variables in single file environment.	**03**	**06**
07	**Arrays (Multi Dimensional) C204.4 C204.5** 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

EXP. NO.	TITLE	COURSE OUTCOME MAPPING
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**



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							
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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							
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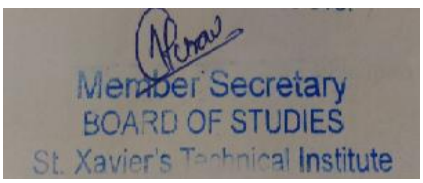


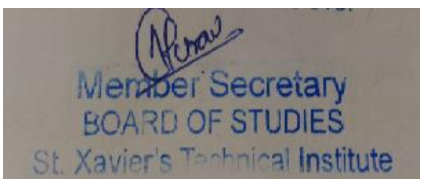
* The final % attainment level for PRACTICAL EXAMINATION of each course outcome may then be computed and the overall % attainment level for the course, for practical exam may then be calculated.

IMPLEMENTATION STRATEGY

1. Teaching plan
2. Minimum 10 practicals/assignments

REFERENCE BOOKS:

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



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

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

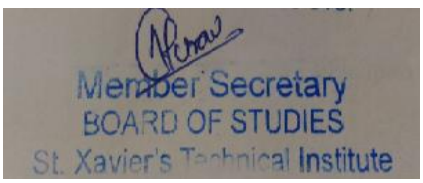
1) Theory paper duration 3 hrs.
2) Theory paper assessment is Internal and External.
3) The assessment of practical is Internal and External.

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

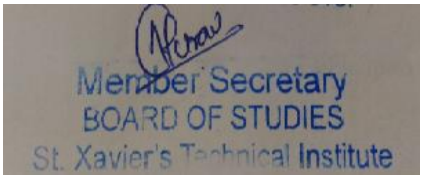
CO SUM TOTAL	06	12	18
CORRELATION LEVEL	1	2	3

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

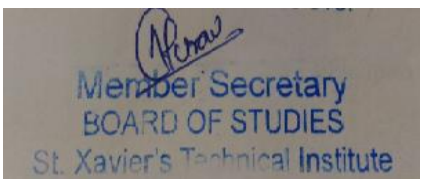


SECTION 1			
Sr. No.	Name of the Topic	Periods	Marks
01	**OP - AMPS: C 205.1 C205.2** 1.1 Block diagram study of an op-amp. Parameters of op amp:- 741- Ideal parameters, definitions- Input offset voltage, Input offset current, Input Bias current, CMRR,PSRR, Slew Rate, Output voltage swing, Gain-Bandwidth 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

EXP. NO.	TITLE	COURSE OUTCOME MAPPING
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



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							
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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	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							
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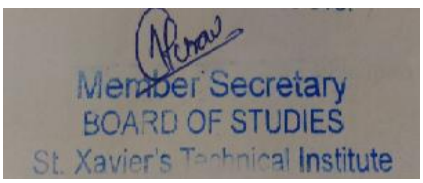


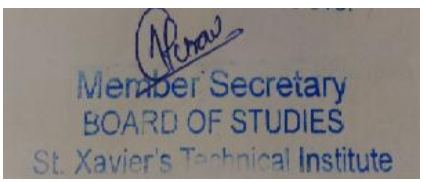
* The final % attainment level for PRACTICAL EXAMINATION of each course outcome may then be computed and the overall % attainment level for the course, for practical exam may then be calculated.

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	3rd	1994	Khanna Publishers, N. Delhi



PROGRAMME TITLE: Diploma in Electronics & Telecom. Engineering ***SEMESTER :*** Three											
Course Code	Course Title	Prerequisite	Credits			Examination Scheme					
						Theory		PR	OR	TW	Total
			L	P	Total	TH	TS				
ET 18319	CIRCUIT BUILDING I **(No Theory exam)**	-	-	**4**	**4**	-	-	-	-	50	50
The assessment of the Circuit Building I term work is Internal.											

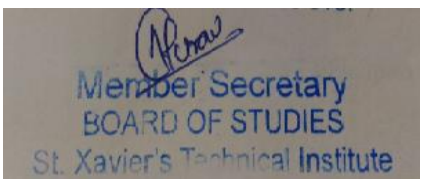
RATIONALE:

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 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

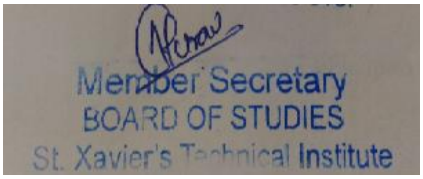
TABLE TO DECIDE CORRELATION LEVELS

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

EXP. NO.	TITLE	COURSE OUTCOME MAPPING
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**
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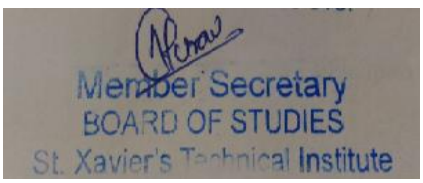

The table to measure the attainment levels for TERM WORK (on a rating scale of "out of 25') of the defined expected course outcomes is as shown in the format given below:

(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							
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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.