ST. XAVIER'S TECHNICAL INSTITUTE, MAHIM, MUMBAI 400 016

Diploma in Electronics and Telecommunication Engineering

Revised in July 2019 and Effective from Dec 2019/ Jan 2020

TEACHING AND EXAMINATION SCHEME

SEMESTER FOUR

Academic Year 2022-2023

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	Entrepreneurship	ET-18411	3	xx	2	5	xx	xx	xx	xx	xx	50	20	50	20	100
2	Principles of Communication II	ET-18412	3	xx	2	5	3	100	40	50	20	xx	xx	25	10	175
3	Digital Electronics	ET-18413	3	xx	2	5	3	100	40	50	20	xx	xx	25	10	175
4	Circuits and Networks	ET-18415	3	xx	2	5	3	100	40	50	20	xx	xx	25	10	175
5	Software Simulation Techniques	ET-18416	xx	xx	2	2	xx	xx	xx	xx	xx	xx	xx	50	20	50
6	Circuit Building II	ET-18419	xx	xx	4	4	xx	xx	xx	xx	xx	xx	xx	**50**	**20**	**50**
7	Industrial Electronics	ET-18420	3	xx	2	5	3	100	40	50	20	xx	xx	25	10	175
8	Academic Skills	ET-18421	xx	xx	2	2	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx
	TOTAL		**15**	**0**	**18**	**33**		**400**		**200**		**50**		**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 StudentContact Hours = 35

Total Marks = **900**

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 Mr.Anil Gurav

From academic year 2019-2020 Online exam for Entrepreneurship will be conducted for **50 Marks .**

From academic year 2018-2019, ET-15422 YOGA was removed.

From academic year 2019-2020 Online exam for Entrepreneurship will be conducted for **50 Marks instead of 100 Marks**

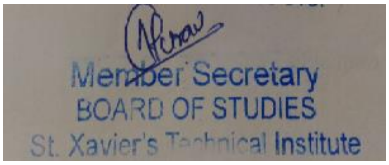
PROGRAMME TITLE: Diploma in Electronics & Telecom. Engineering SEMESTER : Four										
Course Code	Course Title	Credits			Examination Scheme					
					Theory		PR	Online exam	TW	Total
		L	P	Total	TH	TS				
ET 18411	ENTREPRENEURSHIP	3	2	5	-	-	-	50	50	100
There will be **an online exam** for this subject. Practical Experiences assessment for Term Work internal and external.										

RATIONALE:

The objectives of this subject which comes under the Management category are manifold. It will allow the diploma pass-outs to set their sights on profitable, energetic careers of their choice in any given situation and to identify profitable ventures in the ever changing needs of society. The subject steers away from the technology track to a management platform; the curriculum is divided into self contained topics comprising of case studies and assessments of businesses and successful entrepreneurs. The topics include need, scope and characteristics of entrepreneurship, market survey techniques, quality control, PERT and CPM, management of self, and understanding human behavior for effective management techniques. The contents of the subject also deal with coping with uncertainties, stress busting and positive reinforcement.

COURSE OUTCOMES & CO PO MAPPING

SEM IV C 209	ENTREPRENEURSHIP (9 TH COURSE IN SECOND YEAR)
C 209.1	Appraise the need, scope and characteristics of entrepreneurship.
C 209.2	Formulate the need, scope and characteristics of market survey techniques, CPM and PRT.
C 209.3	Assess the need, scope and characteristics quality control and financial considerations.
C 209.4	Combine the importance and requirements in report making/formulation/ references.
C 209.5	Analyse the human behavior for effective management Techniques.
C 209.6	Integrate business planning



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

SEM IV C 209	ENTREPRENEURSHIP (09 TH COURSE IN SECOND YEAR)PREPARED BY : FC & C De									
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
C 209.1					2	3	3	3	2	3
C 209.2	3	1		2	3	3	2	3	3	3
C 209.3		2	1	3	3	2	3	2	3	3
C 209.4	1	1			3	3	3	3	3	3
C 209.5				1	3	3	3	3	3	3
C 209.6	3			2	3	3	3	3	3	3
C 209TOTAL	07	04	01	08	17	17	17	17	17	18
CORRELATION LEVEL	1	1	0	1	3	3	3	3	3	3

TABLE TO DECIDE CORRELATION LEVELS

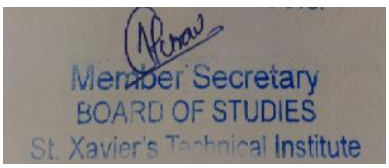
CO SUM TOTAL	06	12	18
CORRELATION LEVEL	1	2	3

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

Mrs.Surbhi Gaoshinde

Ms. Chevon DeSouza

Subject Experts



SECTION 1			
Sr. No.	Name of the Topic	Periods	Marks
01	ENTREPRENEURSHIP, CREATIVITY & OPPORTUNITIES **C 209.1** 1.1 Concept, Classification & Characteristics of an Entrepreneur 1.2 Creativity and Risk taking, Risk Situation, Types of risk & risk takers. 1.3 Liberalization & its Impact on business growth. 1.4 Business Idea Methods and techniques to generate business idea. 1.5 Transforming Ideas in to opportunities transformation :Brain storming 1.6 SWOT Analysis	06	14
02	INFORMATION AND SUPPORT SYSTEMS **C 209.1** 2.1 Information Needed and Their Sources: 2.2 Information related to project, Information related to support system, Information related to procedures and formalities 2.3 Support Systems 2.4 MUDRA,DIC,KVIC,MSME/SSI – Case Study of any Two.	06	12
03	MARKET ASSESSMENT **C 209.2** 3.1 Marketing - Concept and Importance 3.2 Market Identification, Survey Key components 3.3 Market Assessment	05	08
04	BUSINESS FINANCE & ACCOUNTS AND TAXATION **C 209.3** 4.1 Business Finance 4.1.1 Cost of Project 4.1.2 Sources of Finance,Fixed capital & Working Capital-Classify. 4.1.3 Assessment of working capital 4.1.4 Product costing 4.1.5 Profitability 4.1.6 Break Even Analysis 4.2 Business Account 4.2.1 Accounting Principles, Methodology 4.2.2 Book Keeping- Journal entry & Ledger Entry 4.2.3 Financial Statements – Balance Sheet, Profit & Loss Account Format 4.2.4 Concept of Audit 4.2.5 Excise, sales tax, income act, GST.	07	16

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SECTION 2			
Sr. No.	Name of the Topic	Periods	Marks
05	BUSINESS PLAN & PROJECT REPORT **C 209.6** 5.1 Business plan steps involved from concept to commissioning Activity Recourses, Time, Cost 5.2 Project Appraisal 5.2.1 Meaning and definition 5.2.2 Technical, Economic feasibility 5.2.3 Cost benefit Analysis	06	12
06	STRUCTURE OF PROJECT REPORTS **C 209.4** 6.1 Various types of reports 6.2 Meaning and Importance 6.3 Components of project report/profile (Give list) 6.4 References and their tabulations	04	10
07	ENTERPRISE MANAGEMENT AND MODERN TRENDS **C209.5** 7.1 Enterprise Management: 7.1.1 Essential roles of Entrepreneur in managing enterprise 7.1.2 Product Cycle: Concept and importance 7.1.3 Probable Causes Of Sickness 7.1.4 Quality Assurance: Importance of Quality, Importance of testing 7.1.5 E-Commerce: Concept and Process, Advantages. 7.2 Global Entrepreneur 7.2.1 Assess yourself-are you an entrepreneur? 7.2.2 Prepare project report and study its feasibility.	06	14
08	CRITICAL PATH METHOD **C 209.4** 8.1 Critical Path Method and Project Evaluation Review Technique – overview(No numerical). 8.2 (PERT) as planning tools for establishing SST - Definitions, need, advantages, Numericals etc. 8.3 Overview of Project Management (software) pert charts & Gantt Charts.	08	14

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PRACTICAL EXPERIENCES

Conduct of mini-market survey
Student activity through Questionnaires' and personal visits.
SIX ASSIGNMENTS HAVE TO BE COMPLETED BY STUDENTS
Market/ Company surveys/ etc as specified in the list below:

1) Any product/products of their choice.
2) Any service/services of their choice.
3) Getting sponsors for institute day.
4) Researching potential small businesses.
5) Promoting Institute Events.
6) Stress management in industry and organizations

Timings : Minimum **2 hrs**/ week allotted.
Scope of activity: In and Outside the institute premises.

STUDENTS ARE ADVISED TO INCLUDE AT LEAST ONE ASSIGNMENT/ SURVEY/ PRACTICAL EXPERIENCE THAT COVERS MECHATRONICS RELATED TOPICS

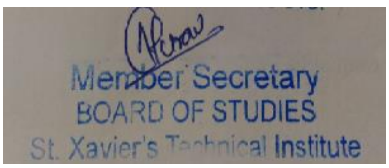
Evaluation for a maximum of 50 marks:

Based on report of activities submitted along with name, address, phone nos., and signatures of clients through practical experiences.
Marks to be given on scope of entrepreneurial activity and not on any revenue earned.
Student activity to be monitored by staff concerned on a regular basis.

THE SIXASSGINMENTS FOR THE TERM WORK MARKS TO BE DONE, ARE IN GENERAL, MEANT TO COVER ALL THE COURSE OUTCOMES.

IMPLEMENTATION STRATEGY:

Teaching method, read the relevant topic.
Explain and discuss include live examples from
1. News papers e.g. TO1.
2. Magazines e.g. Business India, Dalal Street. Alternatively let students prepare a topic to the class.

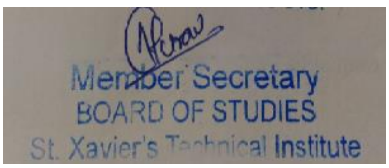


The progress level of the assignment activities is to be monitored on a regular basis, based on the student commitment and interaction, as defined in and related to the "EXPECTED COURSE OUTCOMES" table above and the corresponding stated OBJECTIVES above, during the practical time allotted to them for the ASSIGNMENT WORK by the concerned teacher. The final table to measure the attainment levels (on a rating scale of "out of 50') for the attainment levels of course outcomes through observation of performance as well as the final project report submitted by students in relation to the "translation" of thecourse outcomes is as shown in the format given below:
The **TERM WORK** for this subject is out of **50 marks**.

	COURSE OUTCOMES	C209.1 (out of 50)	C209.2 (out of 50)	C209.3 (out of 50)	C209.4 (out of 50)	C209.5 (out of 50)	C209.6 (out of 50)
STUDENT SPNO							
1303001							
1303002							
1303004							
1303005							
1303006							
1303008							
1303011							
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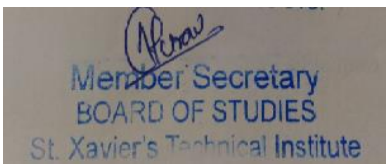
* The final average % attainment level of course outcomes for the course, for term work may then be calculated.

TEACHING AIDS:
Prescribed Books
Newspapers
Magazines
Relevant text papers
Data Projector and Notebook Computer
Chalk board.
CNBC TV . Channel



REFERENCES

S. No.	Author	Title	Edition	Year of Publication	Publisher & Address
1.	B.V. Pathak.	Industrial organization and management	12th	1997	Nirali Prakashan Pune
2.	Prepared by Colombo plan staff college for Technician Education.	Entrepreneurship Development	1st	1999	Tata Mc Graw Hill Publishing co. ltd. New Delhi.
3.	Vinayak Parlikar	Industrial Organization and Management	1st	1993	AUM Book maker Bombay
4	Prin.L.N. Welingkar	Marketing Management	1st	-	Private notes
5.	Steven Silbiger	The 10-Day MBA	1st	1999	Magna Publishing Co.Mumbai
6.	O.P.Khanna	Industrial Engineering & Management	23rd	2016-2017	Dhanpat Rai Publications Ltd.NewDelhi



PROGRAMME TITLE: Diploma in Electronics & Telecom. Engineering SEMESTER : Four										
Course Code	Course Title	Credits			Examination Scheme					
					Theory		PR	OR	TW	Total
		L	P	Total	TH	TS				
ET 18412	PRINCIPLES OF COMMUNICATION II	3	2	5	80	20	50	-	25	175
Theory paper duration 3 hrs. Theory paper assessment is Internal and External. The assessment of **PRACTICAL EXAM** is Internal and External. The assessment of term work is Internal.										

RATIONALE:
As a Core Technology subject, the content focus is on highlightingthe concepts and principles pertaining to Telecommunication systems. Concepts such as Wave Propagation, Transmission and Reception, Television and high frequency communication are covered in this subject. Other important areas covered in this subject are the concepts of construction and working of microwave devices.

COURSE OUTCOMES & CO PO MAPPING

SEM IV C 210	PRINCIPLES OF COMMUNICATION II (10 TH COURSE IN SECOND YEAR)
C 210.1	Compare different types wave propagation
C 210.2	Analyze the working principle and operation of different microwave devices
C 210.3	Compute different parameters of transmission line/ Couplers
C 210.4	Compare different high frequency antennas

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

SEM IV C 210	PRINCIPLES OF COMMUNICATION -- II (10 TH COURSE IN SECOND YEAR)PREPARED BY : VN									
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
C 210.1	**3**	**3**	**3**	**3**	**2**	**2**	**2**	**2**	**2**	**2**
C 210.2	**3**	**3**	**3**	**3**	**3**	**2**	**2**	**2**	**2**	**2**
C 210.3	**3**	**3**	**3**	**3**	**2**	**2**	**2**	**2**	**2**	**2**
C 210.4	**3**	**3**	**3**	**3**	**2**	**2**	**2**	**2**	**2**	**2**
C 210 TOTAL	**12**	**12**	**12**	**12**	**9**	**8**	**8**	**8**	**8**	**8**
CORRELATION LEVEL	**2**	**2**	**2**	**2**	**2**	**1**	**1**	**1**	**1**	**1**

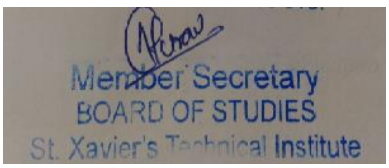
TABLE TO DECIDE CORRELATION LEVELS

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. Vinay Naglikar.

Subject Expert



SECTION 1			
Sr. No.	Name of the Topic	Periods	Marks
01	WAVE PROPAGATION C 210.1 1.1 Fundamentals of electromagnetic wave 1.1.1 Electromagnetic Spectrum & Band Designation. 1.1.2 Reflection, refraction, diffraction & polarization 1.1.3 Rectangular waveguide modes-TE,TM modes, field patterns. 1.1.4 Propagation of waves through rectangular waveguide. 1.2 Ground wave propagation 1.3 Sky wave propagation 1.3.1 Ionosphere 1.3.2 Concept of actual height and virtual height 1.3.3 Definition:- critical frequency, max-usable frequency, skip distance, fading, 1.4 Spacewave propagation 1.5 Duct propagation 1.6 Tropospheric scatter propagation	12	20
02	MICROWAVE DEVICES C 210.2 (Construction,working principles, List of applications) 2.1 Directional coupler, isolator ,circulator,E plane Tee ,H-plane Tee,Magic Tee. 2.2 Two cavity Klystron, Transit time effect. 2.3 Reflex klystron. 2.4 Magnetron, TWT. 2.5 PIN diode & applications 2.6 GUNN diode, point contact diode	12	20
	SECTION 2		
03	TRANSMISSION LINE C 210.3 3.1 Introduction 3.2 Types of Transmission lines 3.3 Electrical Characteristics-Numericals 3.4 Characteristics Impedance & Propagation Constant 3.5 Equivalent circuit of a Transmission 3.6 Transmission losses 3.7 Resonant & Non resonant lines 3.8 Standing wave voltage ratio. 3.9 Simple numericals on topics 3.4 to 3.8	12	20

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SECTION 2			
Sr. No.	Name of the Topic	Periods	Marks
04	HIGH GAIN ANTENNA C 210.4 4.1 Radiation Mechanism 4.2 Types of Antennas Resonant and non-resonant antenna Grounded and ungrounded antenna 4.3 Definitions:- Isotropic antenna,Directive gain, Power gain, Antenna resistance, Antenna Efficiency, Beam-width, Bandwidth, Effective radiated power. 4.4 Antennas:-(Construction,Working principles and Radiation pattern) i. Monopole antenna. ii Dipole antenna-Half wave dipole. iii Dish antenna. iv Yagi-uda antenna v Pyramidal Horn antena. vi Helical antenna. vii Micro-strip patch antenna.	12	20

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	**Wave propagation**	**12**	**12**	**4**	**4**	**20**
2	**Microwave Devices**	**12**	**4**	**12**	**4**	**20**
Section II						
3	**Transmission Line**	**12**	**8**	**8**	**4**	**20**
4	**High Gain Antennas**	**12**	**8**	**8**	**4**	**20**
Total		**48**	**32**	**32**	**16**	**80**

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LIST OF LABORATORY EXPERIENCES

EXP NO.	TITLE	COURSE OUTCOME MAPPING
1.	Study of different components of Microwave	C 210.2
2.	Characteristics of Reflex Klystron Tube	C 210.2
3.	Frequency measurement of Microwave signal using Frequency meter.	C 210.2
4.	Frequency measurement and wavelength of X band Reflex Klystron	C 210.2
5.	Coupling factor of a Cross-Directional Coupler	C 210.2
6.	E plane tee and H plave tee	C 210.2
7.	Study of power division in Magic tee	C 210.2
8.	Measurements on Attenuators	C 210.2
9.	Measurements on Circulators and Isolators	C 210.2
10.	Measurement of Gain of Horn Antenna.	C 210.2
10.	H Plane Tee	C 210.2
12.	Measurements on Isolators	C 210.2
13.	Various Types of Microwave Antennae	C 210.4
14.	Measurement of Bandwidth of Horn Antenna.	C 210.4
15.	Measurement of Attenuation of Horn Antenna.	C 210.1

(Concerned teacher to add two to four additional experiments)
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……)

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LAB EXPERIENCE		1	2	3	4	5	6
	COURSE OUTCOMES	C 210.2 (out of 25)	C 210.2 (out of 25)	C 210.2 (out of 25)	C 210.2 (out of 25)	C 210.4 (out of 25)	C 210.3 (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:

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

IMPLEMENTATION STRATEGY

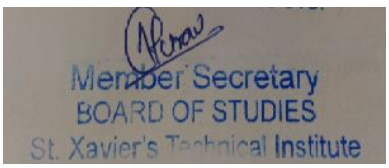
1. Teaching plan
2. Minimum 10 practicals/assignments

REFERENCES

S. No.	Title	Author	Edition	Year of Publication	Publisher & Address
1.	Microwave Devices & Circuits	R. Chatterjee	IInd Edition		Eastwest Press Pvt. Ltd.
2.	Electronics Communication System	George Kennedy	IIIrd Edition		Tata McGraw Hill, New Delhi
3.	Fundamental of RADAR	S. Sundrababu			Media Promoter & Publisher Pvt. Ltd., Bombay

E- REFERENCES

www.Wikipedia.com
www.Sanfoundry.com
https://worldwidescience.org
www. Science.gov
https://www.tutorialspoint.com



PROGRAMME TITLE: Diploma in Electronics & Telecom. Engineering SEMESTER : Four										
Course Code	Course Title	Credits			Examination Scheme					
					Theory		PR	OR	TW	Total
		L	P	Total	TH	TS				
ET 18413	DIGITAL ELECTRONICS	3	2	5	80	20	50	-	25	175
Theory paper duration 3 hrs. Theory paper assessment is Internal and External. The assessment of practical is Internal and External.										

RATIONALE:

This subject is classified under the Applied Technology group and intended to teach the students basics, concepts, principles and working of digital circuits putting forth the use of a transistor as a switch, number systems, Boolean Algebra, logic gates, counters, timers and so on. The cognition attained in this subject will be useful later for solving problems in technology areas like Microprocessors and Microcontrollers, Communication Systems, Industrial Electronics, Instrumentation as well as Control Systems andtheir design. The prerequisite for this subject is knowledge of basic electronic devices and circuits which is covered in earlier semesters, althoughthe prerequisite stated here is not absolutely necessary, since the principles of digital electronics have an independent standing of their own, akin to the principles ofanalog electronics.

COURSE OUTCOMES & CO PO MAPPING

SEM IV C 211	DIGITAL ELECTRONICS (11TH COURSE IN SECOND YEAR)
C 211.1	Use Boolean laws and Karnaugh Map to simplify complex logical expressions
C 211.2	Compare different number system and illustrate different code converters.
C 211.3	Illustrate different type of arithmetic circuits
C 211.4	Illustrate different type of flip-flops.
C 211.5	Design counters and shift registers.
C 211.6	Design digital circuit for any real life problems

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

SEM IV C 211	DIGITAL ELECTRONICS (11TH COURSE IN SECOND YEAR)PREPARED BY : SNJ									
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
C 211.1	**1**	**2**	**2**	**2**	**-**	**-**	**2**	**2**	**1**	**1**
C 211.2	**3**	**2**	**1**	**-**	**-**	**-**	**2**	**2**	**1**	**2**
C 211.3	**2**	**2**	**2**	**2**	**-**	**-**	**2**	**2**	**1**	**1**
C 211.4	**-**	**3**	**2**	**2**	**-**	**-**	**2**	**3**	**1**	**1**
C 211.5	**-**	**3**	**3**	**2**	**-**	**-**	**2**	**2**	**2**	**1**
C 211.6	**3**	**3**	**2**	**1**	**-**	**-**	**2**	**2**	**2**	**3**
C 211 TOTAL	**09**	**15**	**12**	**09**	**00**	**00**	**12**	**13**	**08**	**09**
CORRELATION LEVEL	**2**	**3**	**2**	**2**	**0**	**0**	**2**	**2**	**1**	**2**

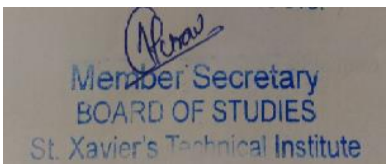
TABLE TO DECIDE CORRELATION LEVELS

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**

Mr. S.N.Jirapure.

Subject Expert



SECTION 1			
Sr. No.	Name of the Topic	Periods	Marks
01	LOGIC GATES AND BOOLEAN ALGEBRA :C 211.1 1.1AND, OR, NOT NAND, NOR, EX-OR and EXNOR gates Logical expression and truth-tables. 1.2 Digital logic Families: 1.2.1 Bipolar, Unipolar TTL - different types TTL NAND Gate and Inverter Parameters V_{IH}, V_{IL}, V_{OH}, V_{OL} I_{IH}, I_{IL}, I_{OH}, I_{OL} 1.2.2 Propagation Delay Time, Power Dissipation Noise margin - Noise Immunity 1.3 Boolean Algebra: 1.3.1 AND Laws, OR Laws, Commutative law, Associative Law, Distributive law, Absorption law, 1.3.2 De-Morgan's Theorems 1.3.3 Simple examples of Boolean Algebra 1.3.4 Sum of the Product and Product of the Sum forms of Boolean Expressions 1.3.5 Writing Truth table from Logical Expression and to write Logical Expression from the Truth Table 1.3.6 Drawing Logical circuit diagram from Logical Expression. 1.4 Karnaugh Map, Drawing K-map for a given function, truth table .	10	16
02	NUMBER SYSTEMS AND DIFFERENT BINARY CODES:C 211.2 2.1 Decimal, Binary, Octal, Hexadecimal system 2.1.1 Conversion of a number from one number system to the other system 2.2 Binary Codes 2.2.1 Weighted codes 8421 2.2.2 Error Detecting code --- Even/odd parity code 2.3 Code converters 2.3.1 Gray to Binary 2.3.2 Binary to Gray 2.3.3 BCD to Decimal 2.3.4 Decimal to BCD 2.3.5 BCD to seven segment decoder	06	10

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03	ARITHMETIC CIRCUITS:C 211.3 3.1 Half Adder using logical gates Logical circuit diagram, Expressions of outputs and working 3.2 Full Adder using logical gates, Full Adder using Half Adders, Logical circuit diagram, Expressions of outputs andworking 3.3 Half subtractor using logical gates, Logical circuit diagram, Expressions of outputs and working 3.4 Full subtractor using logical gates, Logical circuit diagram, Expressions of outputs and working 3.5 Addition, Subtraction of binary numbers 1's & 2's complement 4 Bit Binary Parallel Adder 4 Bit Binary Parallel Adder/Subtractor using 4 Bit 3.6 Multiplexer – 2:1,4:1,8:1. Demultiplexer – 1:2,1:4,1:8.	08	14
	SECTION 2		
04	FLIP-FLOPS:C 211.4 4.1 R-S Flip-flop using NAND gates, NOR gates Truth-table, Race-round condition 4.2 Clocked RS Flip-flop- Level triggering ,Edge triggering (using NAND gates). 4.3 Clocked D Flip-flop using NAND gates, Preset and Clear inputs. 4.4 JK FF using R-S FF its truth table 4.5 Master and slave JKFF, Advantage-over simple JKFF, Preset & clear inputs	10	16
05	REGISTERS:C 211.5 C 211.6 5.1 PIPO - Buffer register 5.2 PISO, 5.3 SIPO, 5.4 SISO - shift registers 5.5 Controlled registers using D FF	04	08
06	COUNTERS:C 211.5 C 211.6 6.1 Asynchronous (ripple) binary counter 6.2 Synchronous (parallel) binary counter 6.3 Design of the above using flip-flops and comparison of thesame. 6.4 Comparison between Asynchronous andSynchronous counters 6.5 Up/Down ripple counter 6.6 Decade counter using RESET input 6.7 Ring counter 6.8 Mod counters design	10	16

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LIST OF LABORATORY EXPERIENCES

EXP. NO.	TITLE	COURSE OUTCOME MAPPING
1	NAND Gate as an Universal Gate	C 211.1
2	Half Adder and Full Adder	C 211.3
3	Four Bit Binary Parallel Adder	C 211.3
4	RS Flip-flop	C 211.4
5	D Flip-flop	C 211.4
6	JK Flip-flop	C 211.4
7	BCD to Decimal Decoder	C 211.2
8	Four Bit Binary Controlled Inverter	C 211.3
9	Decade / BCD Counter using IC 7490	C 211.5
10	Operation and Characteristics of a Shift Register	C 211.5
11	Left Shift and Right Shift operation with Shift Register	C 211.5
11	Arithmetic Operations with Shift Register	C 211.5
13	Ripple Counter	C 211.5
14	Reverse Counter	C 211.5
15	Programmable Counter	C 211.5
16	Modulo 9 Counter	C 211.5
17	BCD to 7 Segment Decoder / Driver for LED Display	C 211.2
18	Constructing a Clock Oscillator	C 211.6

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St. Xavier's Technical Institute

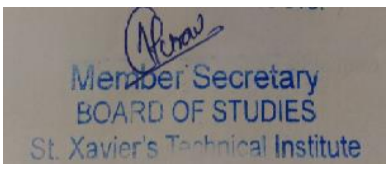
SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Chapter No.	Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
Section I						
1	Logic Gates and Boolean Algebra	10	06	06	04	16
2	Number Systems And Different Binary Codes	06	02	04	04	10
3	Arithmetic Circuits	08	04	04	06	14
Section II						
4	Flip-Flops	10	04	06	06	16
5	Registers	04	02	04	02	08
6	Counters	10	04	04	08	16
Total		48	22	28	30	80

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	C 211.1 (out of 25)	C 211.3 (out of 25)	C 211.3 (out of 25)	C 211.4 (out of 25)	C 211.4 (out of 25)	C 211.4 (out of 25)
STUDENT SPNO							
1303001							
1303002							
1303004							
1303005							
1303006							
1303008							
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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	C 211.1 (out of 50)	C 211.3 (out of 50)	C 211.3 (out of 50)	C 211.4 (out of 50)	C 211.4 (out of 50)	C 211.4 (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 practicalexam may then be calculated.

IMPLEMENTATION STRATEGY

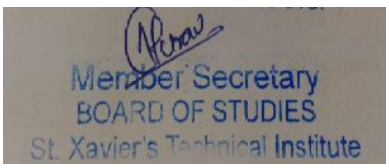
1. Teaching plan
2. Minimum 10 practicals/assignments

REFERENCES

S. No.	Author	Title	Edition	Year of Publication	Publisher & Address
1.	Malvino & Leach	Digital Principles & Applications	4th	1986	TMH
2.	R.P.Jain	Modern Digital Electronics	2nd	1998	TMH
3.	William Gothman	Digital Electronics	2nd	1998	Prentice Hall of India

E-REFERENCES

https://www.tutorialspoint.com/digital_circuits/index.htm
https://tutorialsinhand.com/tutorials/digital-electronics-tutorial/
https://www.youtube.com
http://vlabs.iitb.ac.in/vlabs-dev/labs/digital-electronics/
https://www.mathsisfun.com/binary-digits.html



PROGRAMMETITLE:Diploma in Electronics & Telecomm. Engineering
SEMESTER : Four

Course Code	Course Title	Credits			Examination Scheme					
					Theory					
		L	P	Total	TH	TS	PR	OR	TW	Total
ET 18415	CIRCUITS AND NETWORKS	3	2	5	80	20	50	-	25	175

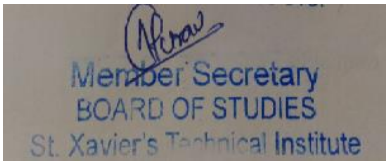
Theory paper duration 3 hrs.
Theory paper assessment is Internal and External.
The assessment of practical is Internal and External.

RATIONALE:

This subject comes under the BasicTechnology group and intended to teach students the concepts and methods of analysis of different types of Electronic Circuits and Networks, network theorems and their applications in electrical and electronic circuits. The prerequisite for this subject is knowledge of basic electronics which is taught in the preceding semesters. It is important to note that a good knowledge of mathematics is necessary for a better understanding of this subject due to the depth of coverage, and hence the practice of the contents covered in the mathematics subjects of the first three semesters isalso essential.

COURSE OUTCOMES & CO PO MAPPING

SEM IV C 212	CIRCUITS AND NETWORKS (12TH COURSE IN SECOND YEAR)
C212.1	Analyze the importance of circuits and networks and its applications in electronics engineering.
C212.2	Demonstrate the importance of different network theorems in electronic circuits.
C212.3	Interpret the concept of time constant in DC circuit.
C212.4	Sketch phasor diagram and calculate power factor, resonance frequency in ac circuits.
C212.5	Calculate different parameters of Symmetrical & Asymmetrical Networks
C212.6	Design different types of Passive filters



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

SEM IV C 212	CIRCUITS AND NETWORKS (12 TH COURSE IN SECOND YEAR)PREPARED BY : SG									
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
C212.1	**3**	**3**	**3**	**1**	**1**			**3**	**1**	**2**
C212.2	**3**	**3**	**3**	**2**	**1**			**3**	**1**	**2**
C212.3	**3**	**3**	**3**	**1**	**1**			**3**	**1**	**1**
C212.4	**3**	**3**	**3**	**1**	**1**			**3**	**1**	
C212.5	**3**	**3**	**3**	**2**	**1**			**3**	**1**	
C212.6	**3**	**3**	**3**	**2**	**1**			**3**	**1**	**2**
C 212 TOTAL	**18**	**18**	**18**	**09**	**06**	**00**	**00**	**18**	**06**	**07**
CORRELATION LEVEL	**3**	**3**	**3**	**2**	**1**	**0**	**0**	**3**	**1**	**1**

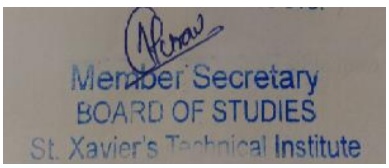
TABLE TO DECIDE CORRELATION LEVELS

CO SUM TOTAL	**06**	**12**	**18**
CORRELATION LEVEL	**1**	**2**	**3**

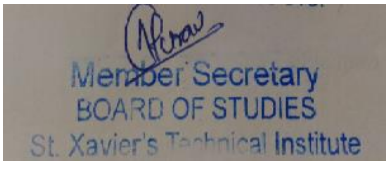
CO SUM TOTAL	**0, 1, 2**	**3, 4, 5, 6, 7, 8**	**9, 10, 11, 12, 13, 14**	**15, 16, 17, 18**
CORRELATION LEVEL	**0**	**1**	**2**	**3**

Mrs. Surbhi G.

Subject Expert



SECTION 1			
Sr. No.	Name of the Topic	Periods	Marks
01	CIRCUIT THEOREMS (FOR AC AND DC) :C 212.2C 212.1 1.1 Kirchoff's Law, Mesh Analysis and Nodal Analysis in the steady-state conditions. 1.2 Thevenin's, Norton's and the Superposition Theorems. 1.3 Maximum Power Transfer Theorem.	10	16
02	D.C. CIRCUITSC 212.3C 212.1 2.1 Growth and Decay of current in L-R and C-R circuits, concept of "Time - Constant". 2.2 La Place Transform – Properties of La Place Transform and Numerical Examples related to the same.	6	10
03	A.C. CIRCUITS :C 212.4C 212.1 3.1 Ohms Law applied to A.C. flowing through combinations of R,L,C. 3.2 The phasor-diagrams, Power Factor of A.C. circuits. Resonance - Types, Selectivity, 'Q'-factor and 'Bandwidth'.	08	14
	SECTION 2		
04	FOUR TERMINAL PASSIVE NETWORKS :C 212.5C 212.1 4.1 Symmetrical Networks : 4.1.1 Characteristic impedance 4.1.2 Propagation Constant 4.1.3 Attenuation. 4.2.1 Asymmetrical Networks 4.2.2 Iterative and Image impedance 4.2.3 Image transfer constant 4.3 The 'T', "π" and 'L' sections in a recurrent network, their characteristic impedance, propagation constant and input impedance. 4.4 Equivalence/ Conversion between 'T' and "Pi" sections. 4.5 Voltage dividers and Attenuators.	12	20
05	PASSIVE FILTERS C 212.6C 213.1 5.1 Constant 'K' Filters – Low pass, High pass, Band pass & Band stop filter – cut-off frequencies,design equations, phase angle for pass & stop band. 5.2 M-derived filters- Low pass, High pass, Band pass & Band stop filter – cut-off frequencies,design equations, phase angle for pass & stop band. 5.3 Block Diagram of Composite Filters.	12	20

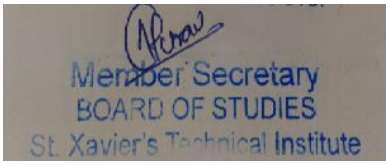


LIST OF LABORATORY EXPERIENCES

EXP. NO.	TITLE	COURSE OUTCOME MAPPING
1	Variation of Inductive Reactance with Frequency	C 212.4
2	Variation of Capacitive Reactance with Frequency	C 212.4
3	L by R Variation	C 212.1
4	C by R Variation	C 212.1
5	M and K by Comparison	C 212.1
6	Attenuation Factor α of a C-R Network	C 212.5
7	Phase Shift Factor β of a C-R Network	C 212.4
8	Parallel Resonance	C 212.4
9	Thevenin's Theorem	C 212.2
10	Norton's Theorem	C 212.2
11	Maximum Power Transfer Theorem	C 212.2
12	Super Position Theorem	C 212.2
13	LAB EXPERIENCE 13	
14	LAB EXPERIENCE 14	
15	LAB EXPERIENCE 15	

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	**CIRCUIT THEOREMS (FOR AC AND DC)**	**10**	**4**	**6**	**6**	**16**
2	**D.C. CIRCUITS**	**6**	**-----**	**6**	**4**	**10**
3	**A.C. CIRCUITS**	**8**	**4**	**6**	**4**	**14**
Section II						
4	**FOUR TERMINAL PASSIVE NETWORKS**	**12**	**4**	**12**	**4**	**20**
5	**PASSIVE FILTERS**	**12**	**4**	**12**	**4**	**20**
Total		**48**	**16**	**42**	**22**	**80**



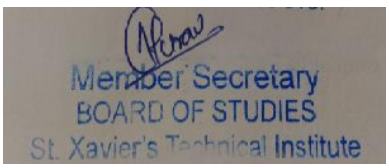
The table to measure the attainment levels for TERM WORK (on a rating scale of "out of 25') of the defined expected course outcomes is as shown in the format given below:
(Note:……the table should progress to the right for Lab Experience 7, 8, 9, ….and so on……)

LAB EXPERIENCE		1	2	3	4	5	6
	COURSE OUTCOMES	C 212.4 (out of 25)	C 212.4 (out of 25)	C 212.1 (out of 25)	C 212.1 (out of 25)	C 212.1 (out of 25)	C 212.5 (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	C 212.4 (out of 50)	C 212.4 (out of 50)	C 212.1 (out of 50)	C 212.1 (out of 50)	C 212.1 (out of 50)	C 212.5 (out of 50)
STUDENT SPNO							
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1303011							



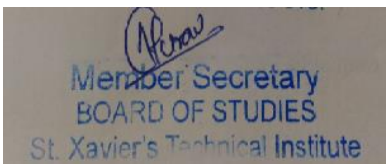
* The final % attainment level for PRACTICAL EXAMINATION of each course outcome may then be computed and the overall % attainment level for the course, for practicalexam may then be calculated.

IMPLEMENTATION STRATEGY
1.Teaching plan.
2. Presentations.
3. Minimum 10 practicals /Assignments.

REFERENCES

Sr. No.	Author	Title	Edition	Year of Publication	Publisher & Address
1	Royal Signals	Handbook of Line Communication Vol. 1			
2	Philip Cutler	Electronic Circuit Analysis			
3	Van Vulkanburg	Network Analysis			

E-REFERENCES
https://electrical-engineering-portal.com/resources/knowledge/theorems-and-laws
https://www.electronics-tutorials.ws/rc/rc_1.html
https://circuitglobe.com/what-is-rlc-series-circuit.html
https://www.electronics-tutorials.ws/accircuits/series-circuit.html
https://blog.oureducation.in/characteristics-parameters-of-the-two-port-network/
https://learnabout-electronics.org/ac_theory/filters81.php



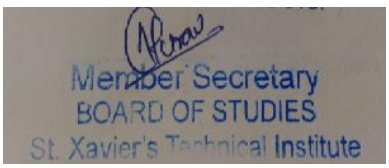
PROGRAMME TITLE:Diploma in Electronics & Telecom. Engineering SEMESTER : Four										
Course Code	Course Title	Credits			Examination Scheme					
					Theory		PR	OR	TW	Total
		L	P	Total	TH	TS				
ET 18416	SOFTWARE SIMULATION TECHNIQUES (No Theory exam)	-	2	2	-	-	-	-	50	50
The assessment of term work/practice is Internal.										

RATIONALE:

This subject belongs to the Applied Technology category. The MATLAB simulation software is universally and widely accepted in all the branches of engineering and not just electronics. It can be used for simulation of circuit operation, waveform analysis, mathematical calculations, etc. The library functions available in this software are very flexible and useful for applying them to simulate real operating conditions and behavior of circuits. Practice on this subject / software will provide the student with a better understanding of all the subjects covered in the earlier semesters, as well as the subjects that will be studied in the fifth and sixth semesters. Knowledge of 'C' Programming will be useful in the use of this software. The experiences designed for this subject will also provide a base and better understanding of using the simulation software in the subject of Basic Control Systems (ET-11414), which also, is included in the fourth semester.

COURSE OUTCOMES & CO PO MAPPING

SEM IV C 213	SOFTWARE SIMULATION TECHNIQUES (13TH COURSE IN SECOND YEAR)
C213.1	Evaluate Arithmetic, Logarithmic, Exponential and Trigonometric expressions in MATLAB.
C213.2	Formulate mathematical problems and implement in MATLAB.
C213.3	Sketch simple plots using MATLAB.
C213.4	Solve various matrix operations using MATLAB.
C213.5	Implement modulated wave forms using Matlab
C213.6	Compose, compile and debug programs in MATLAB.



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

SEM IV C 213	SOFTWARE SIMULATION TECHNIQUES (14 TH COURSE IN SECOND YEAR)PREPARED BY : SD									
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
C213.1	3	2	3	1				1		1
C213.2	3	2	2	2				1		1
C213.3	3	2	3	1				1		1
C213.4	3	2	2	1						1
C213.5	2	2	2	3				1		1
C213.6	2	2	3	1				1		1
C 213 TOTAL	16	12	15	09	00	00	00	05	00	06
CORRELATION LEVEL	3	2	3	2	0	0	0	1	0	1

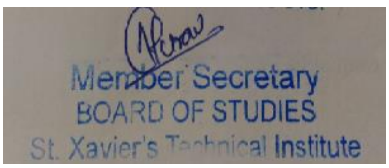
TABLE TO DECIDE CORRELATION LEVELS

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. Sanchita Datta

Subject Expert



LIST OF LABORATORY EXPERIENCES

EXP. NO.	TITLE	COURSE OUTCOME MAPPING
1	Introduction to MATLAB. Calculations using MATLAB – Arithmetic, Exponential, Logarithmic, Trigonometric and calculations involving complex numbers.	C 213.1
2	Creating and working with arrays of numbers.	C 213.2
3	Creating and printing simple plots.	C 213.3
4	Creating, saving and executing a script file.	C 213.1
5	Creating and executing a function file – Converting temperature from Centigrade to Fahrenheit. Finding factorial of number Cross product of vectors.	C 213.6
6	Matrices and Vectors– Indexing a matrix, matrix manipulations – transpose, appending and deleting row or column, matrix operation.	C 213.4
7	Specialized 2-D plots.	C 213.3
8	Amplitude modulation.	C 213.5
9	Frequency modulation.	C 213.5
10	Generation of Continuous Time Signals.	C 213.6
11	Diode Characteristics	C 213.3
12	Pole Zero Plot	C 213.3
13		
14		
15		

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

The table to measure the attainment levels for TERM WORK (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……)

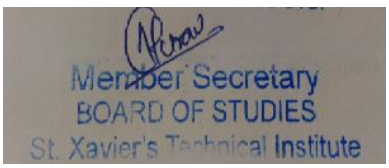
LAB EXPERIENCE		1	2	3	4	5	6
	COURSE OUTCOMES	C 213.1 (out of 50)	C 213.2 (out of 50)	C 213.3 (out of 50)	C 213.1 (out of 50)	C 213.6 (out of 50)	C 213.4 (out of 50)
STUDENT SPNO							
1303001							
1303002							
1303004							
1303005							
1303006							
1303008							
1303011							
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* 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.

IMPLEMENTATION STRATEGY
1. Teaching plan
2. Minimum 10 practicals / assignments

REFERENCES:

Sr. No.	Author	Title	Edition	Year of Publication	Publisher & Address
1	Rudra Prathap	Getting Started with MATLAB-7.0	4th edition	2006	
2					
3					



PROGRAMME TITLE: Diploma in Electronics & Telecom. Engineering SEMESTER : Four										
Course Code	Course Title	Credits			Examination Scheme					
					Theory		PR	OR	TW	Total
		L	P	Total	TH	TS				
ET 18419	CIRCUIT BUILDING II (No Theory exam)	-	4	4	-	-	-	-	50	50
The assessment of the Circuit Building II 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 analog/ digital electronics on bread boards/ 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 digital circuits with their implementation, so as to bring about a clear understanding of the working of these analog/ digital circuits.

The activities and details of the list of circuits to be constructed and tested by the students will be provided by the concerned teacher. The activities are to be 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 IV C 214	CIRCUIT BUILDING II (14 TH COURSE IN SECOND YEAR)
C214.1	**Design, construct & test the Opamp as Instrumentation Amplifier/s, Oscillator/s & Filter/s**
C214.2	**Design, construct & test the TTL logic & counters**
C214.3	**Design, construct & test the Pulse Amplitude Modulator**
C214.4	**Design, construct & test the Mod counter & BCD to 7 segment encoder**

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

SEM IV C 214	CIRCUIT BUILDING II (14 TH COURSE IN SECOND YEAR)PREPARED BY : SD'									
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
C214.1	**3**	**3**	**3**	**3**	**3**			**3**		**3**
C214.2	**3**	**3**	**3**	**3**	**3**			**3**		**3**
C214.3	**3**	**3**	**3**	**3**	**3**			**3**		**3**
C214.4	**3**	**3**	**3**	**3**	**3**			**3**		**3**
C 214 TOTAL	**12**	**12**	**12**	**12**	**12**	**00**	**00**	**12**	**00**	**12**
CORRELATION LEVEL	**3**	**3**	**3**	**3**	**3**	**0**	**0**	**3**	**0**	**3**

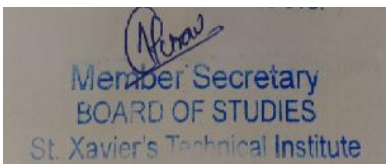
TABLE TO DECIDE CORRELATION LEVELS

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

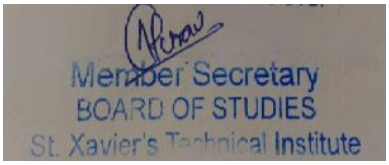
Subject Expert



The term work for this practical oriented subject is out of 50 marks.

LIST OF LABORATORY EXPERIENCES

EXP. NO.	TITLE	COURSE OUTCOME MAPPING
1	Instrumentation Amplifier	C214.1
2	Second Order High Pass Filter	C214.1
3	Fourth Order Low Pass Filter	C214.1
4	Notch Filter With Amplifier	C214.1
5	Wein Bridge Oscillator Using Opamp IC 741	C214.1
6	Pulse Amplitude Modulation (PAM)	C214.35
7	Transistor-Transistor Logic (TTL)	C214.2
8	MOD Counter	C214.4
9	BCD to Seven Segment Display (Single)	C214.4
10	BCD to Seven Segment Display (Dual)	C214.4
11		
12		
13		
14		
15		



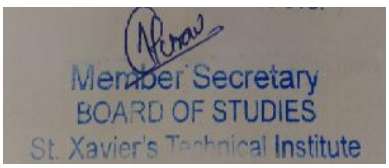
The table to measure the attainment levels for TERM WORK (on a rating scale of "out of 50') of the defined expected course outcomes is as shown in the format given below:

(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	C214.1 (out of 50)	C214.1 (out of 50)	C214.1 (out of 50)	C214.1 (out of 50)	C214.1 (out of 50)	C214.3 (out of 50)
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.

IMPLEMENTATION STRATEGY
1. Teaching plan
2. Minimum 10 practicals / assignments



PROGRAMME TITLE : Diploma in Electronics & Telecom. Engineering SEMESTER : Four										
Course Code	Course Title	Credits			Examination Scheme					
					Theory		PR	OR	TW	Total
		L	P	Total	TH	TS				
ET 18420	INDUSTRIAL ELECTRONICS	3	2	5	80	20	50	-	25	175
Theory paper duration 3 hrs. Theory paper assessment is Internal and External. The assessment of Practicals is Internal and External. The assessment of Term-Work is Internal.										

RATIONALE:

This subjectwhich comes under the Applied Technology group enables the students to comprehend the theory, construction, concepts and working principles of various basic power electronic devices and circuits and their applications in industry. The knowledge acquired by student will help them to design, test, troubleshoot and repair power electronic circuits and systems that are widely used in heavy industries, switching and control systems, induction heating, resistance welding and so on.

COURSE OUTCOMES & CO PO MAPPING

SEM IV C 215	INDUSTRIAL ELECTRONICS (15 TH COURSE IN SECOND YEAR)
C215.1	Categorise the working principle of static power switching Devices for power driven applications
C215.2	Distinguish and use various devices and turn on methods for SCR and Thyristor family.
C215.3	Compare the concept and design of single phase and three phase controlled rectifiers.
C215.4	Illustrate the concept of Resistance Welding.
C215.5	Justify the concept of High frequency heating.
C215.6	Propose the concept of Ultrasonics in various Biomedical and non - destructive testing.

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

SEM IV C 215	INDUSTRIAL ELECTRONICS (15 TH COURSE IN SECOND YEAR)PREPARED BY : VR &SNJ									
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
C215.1	**1**	**2**	**3**	**2**	**2**		**3**	**2**	**2**	**2**
C215.2	**1**	**2**	**3**	**2**	**2**		**2**	**1**	**2**	**2**
C215.3	**3**	**2**	**2**		**3**		**1**	**2**	**2**	**2**
C215.4		**3**	**1**		**2**		**2**	**2**	**2**	**2**
C215.5		**3**	**1**	**1**			**2**	**1**	**2**	**3**
C215.6		**1**	**2**	**2**	**2**		**2**	**2**	**1**	**2**
C 215 TOTAL	**05**	**13**	**12**	**07**	**11**	**00**	**12**	**10**	**11**	**13**
CORRELATION LEVEL	**1**	**2**	**2**	**1**	**2**	**0**	**2**	**2**	**2**	**2**

TABLE TO DECIDE CORRELATION LEVELS

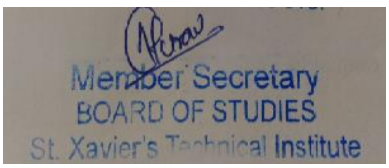
CO SUM TOTAL	**06**	**12**	**18**
CORRELATION LEVEL	**1**	**2**	**3**

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. V. R. Rathod

Mr. S. N. Jirapure

Subject Experts



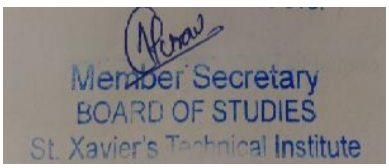
SECTION 1			
Sr. No.	Name of the Topic	Periods	Marks
01	Static Power Switching DevicesC 215.1 1.1 Thyristor Family Devices - construction, Detailed operation, I-V Characteristics, Specifications and ratings. 1.2 Applications of : 1.2.1 SCR *(and two transistor equivalent circuit of SCR)* 1.2.2 TRIAC *(and two SCR anti-parallel connected equivalent)* 1.2.3 DIAC 1.2.4 Power MOSFET 1.2.5 IGBT	08	16
02	Gate Triggering Circuits of SCRC 215.2 2.1 Various Gate Triggering Methods – D.C, A.C & Pulse triggering 2.2 RC firing circuits 2.3 UJT Construction, Characteristics and Application as Relaxation Oscillator 2.4 PUT Construction, Characteristics and Application as Relaxation Oscillator 2.5 Pulse Transformer for gate coupling & isolation, transistor interfacing. 2.6 TRIAC triggering using DIAC(AC phase control) 2.7 Two SCR back to back (anti-parallel) connection for A.C. power control 2.8 Photocell & Optocoupler	08	12
03	Phase Controlled ConvertorsC 215.3 3.1 Concept of Controlled Conversion of a.c to d.c 3.2 Various types of control techniques 3.3 Rectifier Circuits Using SCR 3.3.1 Single Phase Half Wave, Full Wave & Bridge Controlled Rectifier – with Resistive Load. 3.3.2 Expressions (no derivations) for Output d.c voltage, d.c power, output a.c voltage, input a.c power 3.3.3 Simple Numerical Examples based on above expressions. 3.3.4 Controlled Rectifier operation with L+R loads. 3.4 Introduction to three phase controlled rectifiers.	08	12

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SECTION 2			
Sr. No.	Name of the Topic	Periods	Marks
04	Resistance WeldingC 215.4 4.1 Working Principle of Resistance Welding process. 4.2 Importance in the Quality Control of Welding. 4.3 Electronic Circuits used in Resistance Welding – Line Contractor &Sequential Timer. 4.4 IGNITRON – construction & working principle. 4.5 Energy Storage Welding Process. 4.6 Functional Block diagram of Welding Control.	12	20
05	High Frequency HeatingC 215.5 5.1Need & Advantages 5.2 Induction Heating 5.2.1 Operating Principle 5.2.2 Applications – Industrial Heating , Heat Treatment 5.3 Dielectric Heating 5.3.1 Operating Principle 5.3.2 Applications- Industrial, Medical.	08	14
06	Ultrasonics C 215.6 Introduction- Ultrasonic generation, Properties and Applications	04	06

LIST OF LABORATORY EXPERIENCES

EXP. NO.	TITLE	COURSE OUTCOME MAPPING
1	V-I Characteristics of U.J.T.	C 215.2
2	U.J.T. Relaxation Oscillator	C 215.2
3	Characteristics of S.C.R.	C 215.1
4	Characteristics of TRIAC	C 215.1
5	V-I Characteristics of P.U.T.	C 215.2
6	V-I Characteristics of DIAC	C 215.1
7	A.C. Power control using DIAC - TRIAC	C 215.1
8	Full Wave Rectifier Using SCR	C 215.3
9	V-I Characteristics of a Photocell	C 215.2



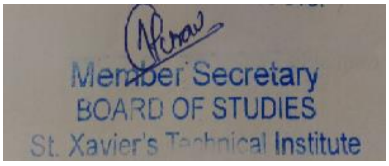
10	Triggering of SCR using DIAC	C 215.2
11	Induction Heating of Conducting Materials-**Study**	C 215.5
12	Dielectric Heating of Nonconducting Materials- **Study**	C 215.5
13	DC Motor Speed Control using SCR	C304.3
14	Application of Induction Heating	C304.5
15	H bridge using Power MOSFET **IRF 540**	C304. 1

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	**Static Power Switching Devices**	**08**	**06**	**06**	**04**	**16**
2	**Gate Triggering Circuits of SCR**	**08**	**04**	**04**	**04**	**12**
3	**Phase Controlled Converters**	**08**	**08**	**06**	**06**	**20**
Section II						
4	**Resistance Welding**	**12**	**06**	**04**	**04**	**14**
5	**High Frequency Heating**	**08**	**06**	**04**	**04**	**14**
6	**Ultrasonics**	**04**	**02**	**02**	**02**	**06**
Total		**48**	**16**	**42**	**22**	**80**

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	C 215.2 (out of 25)	C 215.2 (out of 25)	C 215.1 (out of 25)	C 215.1 (out of 25)	C 215.2 (out of 25)	C 215.1 (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: (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	C 215.2 (out of 50)	C 215.2 (out of 50)	C 215.1 (out of 50)	C 215.1 (out of 50)	C 215.2 (out of 50)	C 215.1 (out of 50)
STUDENT SPNO							
1303001							
1303002							
1303004							
1303005							
1303006							
1303008							

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

IMPLEMENTATION STRATEGY

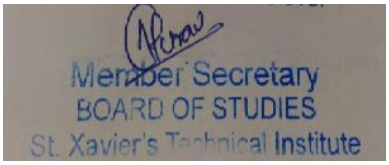
1.Teaching plan
2.Minimum 10 practicals

REFERENCES

S. No.	Author	Title	Edition	Year of Publication	Publisher & Address
1.	J.S. Katre	Industrial Electronics		2009	Tech Max
2.	P.C. Sen	Power Electronics	1st	1987	Tata Mcgraw Hill
3.	Williams	Power Electronics & Applications	1st	1987	Macmillan Education Ltd

E-REFERENCES

www.nptel.ac.in/courses /108101038
PS1M software for power electronics
www.en.wikibooks.org/wiki/Power_Electronics
www.books.google.co.in/books/about/Power Electronics



PROGRAMME TITLE : Diploma in Electronics & Telecom. Engineering SEMESTER : Four										
Course Code	Course Title	Credits			Examination Scheme					
					Theory		PR	OR	TW	Total
		L	P	Total	TH	TS				
ET-18421	**ACADEMIC SKILLS**	-	2	2	-	-	-	-	-	-
Non-Exam Course.										

RATIONALE:

This subject which belongs to the Foundation category does not carry any credits and there is no examination for the same. It gives an opportunity to sharpen their presentation skills on a topic selected by students from the subjects of the diploma course. These skills encompass reading, researching and gathering information, synthesis and analysis of content matter, writing reports, making presentations and delivering them effectively with confidence. The most recent necessary academic skill is being computer savvy. Computers are used for almost everything, including work and learning. In order to compete in the global marketplace, students need to be able to use computers, especially popular software and the Internet. Computer skills are essential for studying, research, and writing, as well as for communication. These same skills become an integral part and parcel of one's life in the work environment without one being even aware of it. Students are required to make a PowerPoint presentation on a topic of their choice and present the same to an audience comprising of staff and students.

COURSE OUTCOMES & CO PO MAPPING

SEM 4 C 216	ACADEMIC SKILLS NON-EXAM COURSE IN SECOND YEAR)
C 216.1	Choose and gather information on appropriate topic in the field of interest.
C 216.2	Select appropriate features of Microsoft power point to prepare presentation slides.
C 216.3	Develop understanding of the concepts in the chosen technical fields.
C 216.4	Develop confidence to present in front of audience.

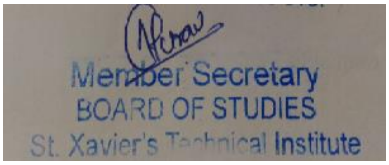
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BOARD OF STUDIES
St. Xavier's Technical Institute

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

SEM I C 216	ACADEMIC SKILLS (NON-CREDIT, NON-EXAM COURSE IN SECOND YEAR)									
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
C 216.1							2	2		
C 216.2		3							2	
C 216.3	2				2	1				
C 216.4			2					1	3	1
C 216 TOTAL	2	3	2	0	2	1	2	3	5	1
CORRELATION LEVEL	0	1	0	0	0	0	0	1	1	0

TABLE TO DECIDE CORRELATION LEVELS

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



RUBRICS FOR ATTAINMENT ASSESSMENT - ACADEMIC SKILLS
Rubrics Prepared by Vijay M. Vaghela

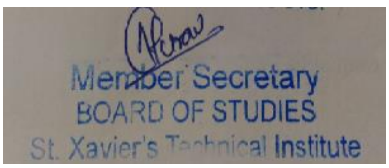
Teacher Name: _____

Student Name: _____Student SPN No._____

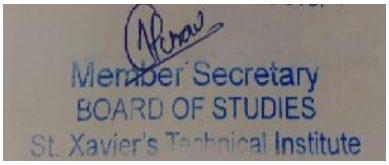
TITLE OF TOPIC: _____

NOTE: Student performance attainment levels will be calculated based on the **TEN** criteria given in the following table. The maximum points that can be scored by a student in any one criterion are 4 and the minimum points that can be scored is 1. Maximum points that can be scored are 40 and the minimum points awarded will be 10.

CRITERIA	4	3	2	1	POINTS
Topic (C216.1)	Topic objectives are advanced, deal with innovative ideas/ concepts, spark interest and are application oriented	Topic and topic objectives are very common, theory oriented and basic	Title and topic objectives are very basic, stated and actual content co-relation is poor	No relation between topic objectives and content.	
Information Gathering and Resources (C216.1)	Various information resources like books, magazines, published papers, Authentic Internet Resources, etc. were thoroughly referred	Information search was done from various resources, but not thoroughly	All information was collected from a single unverified Internet resource like wikipedia	Absolutely no researching or gathering of information done and content directly copied and pasted from Internet websites	
Introduction and "Purpose" of Topic (C216.1)	Introduction and purpose of topic are presented very well and have a "grabber" or catchy beginning.	Introduction to the topic and purpose of topic are vaguely presented and confused	No introduction and purpose of topic are provided	Only interpretations and conclusions are stated.	
Planning of Content Flow and Sequence (C216.3)	Very organized with proper sequencing through the entire presentation	Some organization and not so well planned Has a point to the lesson, but not sufficient information about the topic	Very little organization and not planned and not focused with irrelevant information	Completely unorganized and absolutely no planning or sequencing.	



CRITERIA	4	3	2	1	POINTS
Clarity of Presented Information in the PowerPoint features used (C216.2)	All information presented was clear, accurate and thorough.	Most information presented was clear, accurate and thorough.	Most information presented was clear and accurate, but was not usually thorough.	Information had several inaccuracies OR was usually not clear.	
Presentation (Communication) Style & Language Skills (English) (C216.4)	Student consistently used gestures, eye contact, tone of voice and a level of enthusiasm in a way that kept the attention of the audience. Excellent command over language	Student usually used gestures, eye contact, tone of voice and a level of enthusiasm in a way that kept the attention of the audience. Reasonably good command over language	Very little use of gestures, eye contact, unenthusiastic disinterested tone of voice Fairly good language skills	Could not keep the attention of the audience at all. Language skills are very poor	
Evidence and Examples (C216.3)	All of the evidence and examples are specific, relevant and explanations are given that show how each piece of evidence supports the student's position.	Most of the evidence and examples are specific, relevant and explanations are given that show how each piece of evidence supports the student's position.	At least one of the pieces of evidence and examples is relevant and has an explanation that shows how that piece of evidence supports the position of the topic and purpose.	Evidence and examples are NOT relevant AND/OR are not explained.	
Accuracy of Content (C216.3)	All supportive facts and statistics are reported accurately.	Almost all supportive facts and statistics are reported accurately.	Most supportive facts and statistics are reported accurately.	Most supportive facts and statistics were inaccurately reported.	
Conclusion/ Closing/ Ending (C216.3)	The conclusion is strong and leaves the audience solidly understanding the topic. Effective reiteration of the purpose statements during conclusion	The conclusion is recognizable. The student's position is restated within the first two sentences of the closing.	The purpose is restated during the closing but the conclusion is vague	There is no conclusion - the presentation just ends.	



CRITERIA	4	3	2	1	POINTS
References (C216.2)	Proper references (and links) were provided for individual subtopics/ slides/ or at the end of the presentation on the concluding slide for content as well as the images used	Proper references (and links) were provided for individual subtopics/ slides/ or at the end of the presentation on the concluding slide only for content but not the images used	Very few or only one or two references provided	Absolutely no references provided anywhere	

TOTAL POINTS SCORED = _____

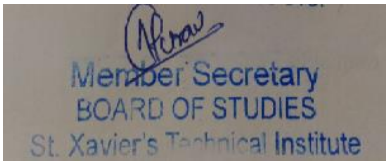
Maximum points that can be scored are 4 x 10 = 40 points
Minimum points that can be scored are 1 x 10 = 10 points
Performance attainment levels will be calculated as a percentage of points obtained out of 40 points.

CONTENTS

1. Students consult respective guides and get their topic approved.
2. Student has to prepare presentation on any Technical topic of his interest (Related to Electronics/Telecommunication, Biomedical/Instrumentation, Computer/IT) containing 7 to 10 slides and which can be covered within 10- 12 minutes.
3. Guide has to ensure that there is no repetition of the topic and the content is up to the mark.
4. Students will submit a soft copy of his/her ppt to guide and give their presentation in presence of their guide and class mates.
5. After the presentation there will be a question-answer session between the presenter, guide and students group.
6. Points will be given by guide (out of 40) depending on Topic selected, actual presentation, clarity of explanation, understanding of the topic, etc. as listed in the 10 specific criteria in the rubrics assessment methodology given above. Weightage of points will be equally distributed based on the above criteria.

NOTE FOR TEACHERS:

During the two hour sessions the concerned teacher should devote at least one hour to guide the students about how to achieve maximum points for each of the criterion stated in the above designed rubrics for the purpose of assessment/ measurement of the attainment of the stated course outcomes.
Teacher should motivate students to search information from appropriate web sources.
Students should refer to books (online/ offline) for the purpose of information research and survey.
Teacher will validate the information collected by students.
Teacher will check, discuss and give instruction on how to make a good quality presentation including videos, images, text etc.
Teacher should explain how to communicate and give presentation in front of audience.



PROGRAMME TITLE : Diploma in Electronics & Telecom. Engineering SEMESTER : Four										
Course Code	Course Title	Credits			Examination Scheme					
					Theory		PR	OR	TW	Total
		L	P	Total	TH	TS				
ET-18423	SPORTS & CULTURAL	-	2	2			-	-	-	-
Non-Credit, Non-Exam Course.										

RATIONALE:

This course is primarily to motivate the co-curricular activities among the students and develop team spirit. To overcome the sedentary life style of the youth in the present generation, this course involves physical and mentalactivities, which is essential for theiroverall development.

SPORTS:

1. Practice session
2. Team selection for the following:
   - Cricket
   - Football
   - Volleyball
   - Basketball
   - Kabaddi
   - Kho-kho
   - Athletics- Relay,100m,200m,400m,shotput,Javeline,Disc throw
   - Carrom
   - Chess
   - Table tennis
3. Team coaching sessions for tournaments as per rules & regulations of the respective game.
4. Event experience sharing/feedback after a tournament and changes incorporated accordingly

CULTURAL:

1. Practice session for the following events:
   - Singing
   - Dancing
   - Debate/Extempore
2. Audition
3. Team selection for orchestra,dances based on various dance styles and Debate
4. Respective team coaching sessionsas per rules & regulations followed in inter-college cultural festivals.
5. Event experience sharing/feedback after an event and changes incorporated accordingly.

