



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

Revised and Effective from July 2013			TEACHING AND EXAMINATION SCHEME											SEMESTER FOUR				
Academic Year 2013-2014			Teaching Scheme				Examination Scheme											
<i>Subject to changes in December 2013 before commencement of Semester</i>																		
Sr. No.	Subject Title	Subject Code	TH	TU	PR	CREDITS	PAPER HRS	THEORY		PRACTICAL		ORAL		TERM WORK		TOTAL		
								Max	Min	Max	Min	Max	Min	Max	Min			
1	Entrepreneurship	ET-11411	3	xx	2	5	3	100	40	xx	xx	xx	xx	50	20	150		
2	Principles of Communication II	ET-11412	3	xx	2	5	3	100	40	xx	xx	50	20	25	10	175		
3	Digital Electronics	ET-11413	3	xx	2	5	3	100	40	50	20	xx	xx	25	10	175		
4	Basic Control Systems	ET-11414	3	xx	2	5	3	100	40	xx	xx	50	20	25	10	175		
5	Circuits and Networks	ET-11415	3	xx	2	5	3	100	40	50	20	xx	xx	25	10	175		
6	Software Simulation Techniques	ET-11416	xx	xx	2	2	xx	xx	xx	xx	xx	xx	xx	50	20	50		
7	Mechatronics (Proposed subject)	ET-11419	2	xx	2	4	xx	xx	xx	xx	xx	50	20	50	20	100		
TOTAL			17	0	14	31		500		100		150		250		1000		
Total Number of Credits, or Student Contact Hours =						31											Total Marks =	1000
Abbreviations:			1) TH	Theory		Note:	1) For progressive and continuous assessment two periodic tests of 20 marks each will be conducted for all the theory subjects. The average of these will be added to the final theory examination marks which will be of 80 marks. 2) All term work marks are Internal. 3) All practical exams/ oral are External and Internal.											
			2) TU	Tutorial														
			3) PR	Practical														
			4)	No Theory Exam														
Semester 4																		

PROGRAMME TITLE: Diploma in Electronics & Telecom. Engineering											
SEMESTER : Four											
Course Code	Course Title	Prerequisite	Credits			Examination Scheme					
			L	P	Total	Theory		PR	OR	TW	Total
						T H	T S				
ET 11411	ENTREPRENEUR SHIP		3	2	5	80	20	-	-	50	150

1) Theory paper duration 3 hrs.
 2) Theory paper assessment is internal and external.
3) 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.

SECTION 1			
Sr. No.	Name of the Topic	Periods	Marks
01	NEED, scope & characteristics of entrepreneurship STED special schemes for the technically educated. Introduction, definitions, importance, characteristics components, skill, qualities, scope and attitude of entrepreneurship. Three types of employment , wage ,self , entrepreneurship. Demonstration effect Assistance in the form of subsidies , finance, relief in form of taxes and duties. Preference for price, land power and raw material. Marketing and export assistance from directorate of industries; joint directorate of industries; DIC (district industries center) Technical consultancy from MITCON. Other services from IDBI; SFC; SSIDC. Address of above centers	03	06

DETE SYLLABUS FOR FOURTH SEMESTER – JANUARY 2014

Sr. No.	Name of the Topic	Periods	Marks
02	<p>Identification of opportunities Advantages & disadvantages of acquiring established business. Commonly used methods of acquiring established business. Considerations for structuring an acquisition. Franchising, franchisers and franchises How changes in Europe and pacific rim provide Sources of help & information for local and global business.</p>	03	06
03	<p>Need scope approaches for project formulation. Idea of project work Project planning in nineteen steps. Tables for various budgets like sales, production, financial and material .Advantages of project report. Seven broad heading of project report. Personal project report Production programme report Machineries / equipment report Raw material & man power report Cost of project report for fixed capital, working capital, total cost , means of finance & profitability analysis. Supplementary details & references. Techno-economic feasibility of the project. Idea generation for project feasibility with its various stages like identification pre selection and analysis stages. Preliminary screening of Venture ideas. Pre-feasibility report.</p>	03	06
04	<p>Institutions, Financing procedures & financial incentives. Nature & types of capital Sources of capital Classification of capital raised by public ltd company. Types of banks, leasing and financial institutions with finance from them. Term requirement of finance. Shares and their functional classifications Comparisons between shares and debentures. Methods of appealing for loan .Instruments of credit.</p> <p>Schemes for the technically educated. Central and state government policies for STED. Function of district industrial centers and development commissioner Ministry of industry, government of India Udyog Bhavan, New Delhi 110001 with reference to STED .Subsides with reference to cash, interest, equipment, labor and project report. Preference with reference to price, land, power and raw materials Relief in taxes and duties . Export and local marketing assistance Functions of directorate of industries & joint director of industries.</p>	06	08

DETE SYLLABUS FOR FOURTH SEMESTER – JANUARY 2014

Sr. No.	Name of the Topic	Periods	Marks
05	STRUCTURE OF PROJECT REPORTS Various methods of reports and their tabulations	03	06
06	State financial corporation and its various schemes. SSIDC (small scale industries development corporation) And their activities. Types of banks ; their functions 7 pit falls. National & international banks .RBI ; commercial banks co-operative banks KVIC & state owned banks. Reserved of products for SSI (small scale industries) sector. Names and addresses of government agencies in Maharashtra assisting entrepreneurs	06	08
SECTION 2			
07	Management of self and understanding human behavior Need to understand human behavior Behavioral science and industrial engineering. Individual, group and mob psychology. Douglas Mc Gregory theory x & y Self Management. Time Management	06	10
08	Coping with uncertainties ;stress management positive reinforcement. Insurance and non insurance risks Symptoms of stress. Kinds of stress , organizational stress – non work stress – positive stress and negative stress Approaches to overcome stress impact .Reiki; meditation and pranayama. Uses of human bioplasma for disease cure. Chakra cure. Channelising universal life force for healing; health and super vitality. Meditations techniques.	06	10
09	Licensing registration Municipal Byelaws and insurance coverage. Excise, sales tax , income act. To be studied as self study (10%) students have to go to offices, banks and internet to get information.	05	08
10	Critical Path Method (CPM)and project Evaluation Review Technique (PERT)as planning tools for establishing SST. Definitions, need, advantages, problems etc. Project Management (software) pert charts & Gantt Charts.	05	08

DETE SYLLABUS FOR FOURTH SEMESTER – JANUARY 2014

Sr. No.	Name of the Topic	Periods	Marks
11	Trade marks, copy right, patent , intellectual property rights. Requirements for a successful patent grant. Major steps in obtaining a patent trademarks & its advantages. Copyright & fair use concept, intellectual property protection with respect to s/w programs, protection achieved by patents, copyrights etc.	02	04

SUGGESTED PRACTICAL EXPERIENCES BY STAFF MEMBER

Entrepreneurship SEM 4
Management Course

Practicals (50 marks or 75 marks ??? 3 hours or 2 hours..... OR 4 HOURS?)

Conduct of mini-market survey

Student activity through Questionnaires' and personal visits.

Market survey to be as per students choice on any one of the following:

- a) Any product/products of their choice.
- b) Any service/services of their choice.
- c) Getting sponsors for institute day.
- d) Getting sponsors for Educational expositions.
- e) Getting clients for Educational expositions.

Timings : Minimum **2 hrs** / week allotted.

Scope of activity: In and Outside the institute premises.

Evaluation for a maximum of 50 marks.

- i) Based on report of activities submitted along with name, address, phone nos., and signatures of clients as term work.
- ii) Marks to be given on scope of entrepreneurial activity and not on any revenue earned.
- iii) Student activity to be monitored by staff concerned on a regular basis.

SUBJECT TO APPROVAL AT THE INTERNAL AND EXTERNAL BOARD OF STUDIES MEETING TO BE HELD IN NOVEMBER – DECEMBER 2013

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.

TEACHING AIDS:

Prescribed Books

Newspapers

Magazines

Relevant text papers

Data Projector and Notebook Computer

Chalk board.

CNBC TV . Channel

REFERENCES

<u>S. No.</u>	<u>Author</u>	<u>Title</u>	<u>Edition</u>	<u>Year of Publication</u>	<u>Publisher & Address</u>
1.	B.V. Pathak.	Industrial organization and management	12th	1997	Nirali Prakashan Pune
2.	Vasant Desai	Dynamic Entrepreneurial Development and Management	2nd	1992	Himalaya house Mumbai
3.	Vinayak Parlikar	Industrial Organization and Management	1st	1993	AUM Book maker Bombay
4	Prin.L.N. Welingkar	Marketing Management	1st	-	Private notes
5.	David H.Holt	Entrepreneurship	1st	1999	Prentice Hall of India
6.	Steven Silbiger	The 10-Day MBA	1st	1999	Magna Publishing Co.Mumbai

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Course Code	Course Title	Prerequisite	Credits			Examination Scheme					
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						T H	T S				
ET 11412	PRINCIPLES OF COMMUNICATION II	ET-11312	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 **oral examination** is Internal and External.
 4) The assessment of term work is Internal.

RATIONALE:

As a Core Technology subject, the content focus is on highlighting the 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.

SECTION 1			
Sr. No.	Name of the Topic	Periods	Marks
01	Wave Propagation 1.1 Fundamental of electromagnetic wave 1.1.1 Transverse electromagnetic wave 1.1.2 Polarization 1.1.3 Reflection, refraction, diffraction 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 Space wave propagation 1.5 Duct propagation 1.6 Tropospheric scatter propagation	12	20

DETE SYLLABUS FOR FOURTH SEMESTER – JANUARY 2014

02	<p>MICROWAVE DEVICES</p> <p>2.1 Cavity resonator, Concept of directional coupler, isolator and circulator</p> <p>2.2 Two cavity Klystron, Transit time effect</p> <p>2.3 Reflex klystron</p> <p>2.4 Magnetron, TWT</p> <p>2.5 PIN diode & applications</p> <p>2.6 GUN diode, varactor diode, point contact diode</p>	12	20
SECTION 2			
03	<p>TRANSMISSION LINE</p> <p>3.1 Introduction</p> <p>3.2 Types of Transmission lines</p> <p>3.3 Electrical Characteristics</p> <p>3.4 Characteristics Impedance & Propagation Constant</p> <p>3.5 Equivalent circuit of a Transmission</p> <p>3.6 Transmission losses</p> <p>3.7 Resonant & Non resonant lines</p> <p>3.8 Standing wave voltage ratio</p> <p>3.9 Problems on the above topic</p>	10	16
04	<p>HIGH GAIN ANTENNA</p> <p>4.1 Construction and principle of working of YAGI-UDA Antenna</p> <p>4.2 Types of Dish Antenna</p> <p>4.3 Construction and working of dish antenna</p> <p>4.4 Beam width & Gain</p> <p>4.5 Gain - bandwidth calculations</p> <p>4.3 Horn antenna (Pyramidal and circular)</p> <p>4.4 Helical antenna</p> <p>(More detailing and possible content to be/ will be provided by concerned staff)</p>	07	12
05	<p>RADAR</p> <p>5.1 Basic principle of working of RADAR</p> <p>5.2 Radar range equation</p> <p>5.3 Radar classification</p> <p>5.4 Doppler effect</p> <p>5.5 CW Doppler radar</p> <p>5.6 Moving target indication</p> <p>5.7 Radar beacons</p>	07	12

LIST OF EXPERIMENTS :

1. Plot the characteristics of Klystron.
2. Measurement of freq. and wavelength of Klystron based microwave bench.
3. Measurement of the VSWR by using Klystron based microwave bench.
4. Measurement of impedance of the Klystron tube by using test bench.
5. Measurement of gain of YAGI-UDA antenna.
6. Measure and plot the radiation pattern of YAGI-UDA antenna.
7. Identification of the various parts and parameters of DISH antenna.
8. Visit to facility having pulsed RADAR system. (in-house facilities may be availed)

(Concerned teacher to add two to four additional experiments)

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

Details of the references to be/ will be provided by the concerned teacher

PROGRAMME TITLE: Diploma in Electronics & Telecom. Engineering											
SEMESTER : Four											
Course Code	Course Title	Prerequisite	Credits			Examination Scheme					
			L	P	Total	Theory		PR	OR	TW	Total
						T H	T S				
ET 11413	DIGITAL ELECTRONICS	ET-11112	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:

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 and their design. The prerequisite for this subject is knowledge of basic electronic devices and circuits which is covered in earlier semesters, although the prerequisite stated here is not absolutely necessary, since the principles of digital electronics have an independent standing of their own, akin to the principles of analog electronics.

SECTION 1			
Sr. No.	Name of the Topic	Periods	Marks
01	LOGIC GATES AND BOOLEAN ALGEBRA : 1.1 AND, 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	07	12

DETE SYLLABUS FOR FOURTH SEMESTER – JANUARY 2014

	<p>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 .</p>		
02	<p>NUMBER SYSTEMS AND DIFFERENT BINARY CODES: 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 8421,7421 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</p>	07	12
03	<p>ARITHMETIC CIRCUITS: 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 and working 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</p>	10	16

SECTION 2			
04	<p>FLIP-FLOPS:</p> <p>4.1 R-S Flip-flop using NAND gates, NOR gates Truth-table, Race-round condition</p> <p>4.2 Clocked RS Flip-flop Level triggering , Edge triggering (using NAND gates)</p> <p>4.3 Clocked D Flip-flop using NAND gates Preset and Clear inputs</p> <p>4.4 JK FF using R-S FF its truth table Master and slave JKFF Advantage-over simple JKFF, Preset & clear inputs</p>	07	12
05	<p>REGISTERS:</p> <p>Types of registers :</p> <p>5.1 PIPO - Buffer register</p> <p>5.2 PISO,</p> <p>5.3 SIPO,</p> <p>5.4 SISO - shift registers</p> <p>5.5 Controlled registers using D FF</p>	07	12
06	<p>COUNTERS:</p> <p>6.1 Asynchronous (ripple) binary counter</p> <p>6.2 Synchronous (parallel) binary counter</p> <p>6.3 Design of the above using flip-flops and comparison of the same.</p> <p>6.4 Comparison between Asynchronous and Synchronous counters</p> <p>6.5 Up/Down ripple counter</p> <p>6.6 Decade counter using RESET input</p> <p>6.7 Ring counter</p> <p>6.8 Mod counters design</p>	10	16

EXPERIMENT LIST :

1. Verify truth tables of NAND GATE as Universal gate Using IC 7400.
2. Verify truth table of BCD to Decimal Decoder using IC 7442.
3. Build Binary to Gray and Gray to Binary Converter and verify their truth table.
4. Verify truth table of four bit Binary controlled Inverter using EX –OR gate IC 7486.
5. Build Half Adder and Full Adder using IC 7408, 7486, 7432 and verify their truth table.
6. Verify truth table of Four Bit Binary Parallel Adder using IC 7483.
7. Build RS Flip-Flop using NAND gates and verify its truth table.
8. Build RS Flip-Flop using NOR gates and verify its truth table.
9. Verify truth table of JK Flip-Flop using IC 74107.
10. Verify truth table of D - Flip-Flop using IC 7474.
11. Verify truth table of Decade / BCD Counter using IC 7490.
12. Build Ripple Counter using JK Flip Flop (74107) and verify its truth table

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	4 th	1986	TMH
2.	R.P.Jain	Modern Digital Electronics	2 nd	1998	TMH
3.	William Gothman	Digital Electronics	2 nd	1998	Prentice Hall of India

PROGRAMME TITLE: Diploma in Electronics & Telecom. Engineering											
SEMESTER : Four											
Course Code	Course Title	Prerequisite	Credits			Examination Scheme					
			L	P	Total	Theory		PR	OR	TW	Total
						T H	T S				
ET 11414	BASIC CONTROL SYSTEMS		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 oral is Internal and External.											

RATIONALE :

This subject is classified under the Applied Technology group and is introduced with a view that the students will be exposed to various types of control systems. More emphasis is given for understanding the basic concepts of control systems. Students are required to know the various components of a control system, basic concepts of stability, time domain and frequency domain characteristics, when they are working in process industries.

OBJECTIVE :

After completion of this subject students will be able to

- Understand the types of control systems.
- Understand the working of control systems.
- Find the transfer function of simple systems.
- Draw the block diagrams of various control systems.
- Explain the control systems.
- State the characteristics of time and frequency response.
- Draw the Bode, Polar, Nyquist plot for simple problems.
- Check the stability of the control system using different techniques.
- Explain the working principles of different control system components.
- State the specifications of control system components.

SECTION 1			
Sr. No.	Name of the Topic	Periods	Marks
01	<p>Introduction to control system & transfer function</p> <p>1.1 Historical background, concept of feedback. Open loop and closed loop systems: examples, comparison, block diagram representation of Automatic control system, components, terminology, and Advantages: Refrigerator control(Freeze).</p> <p>1.2 Brief introduction to following control systems: Servomechanism, Linear and nonlinear control system. Time-variant and time-invariant, analog and digital control, multivariable control system, process control systems.</p> <p>1.3 Concepts of transfer function and properties.</p> <p>1.4 Integrals-differential equations of physical system: electrical, mechanical systems. Force-voltage, force-current analogy.</p> <p>1.5 Block diagram reduction techniques.</p> <p>1.6 Signal flow graph techniques.</p>	10	16
02	<p>Time domain Characteristics</p> <p>2.1 Standard test signals. Step, ramp, parabolic, impulse: mathematical and graphical representation, transfer function.</p> <p>2.2 Time response of first order system: concept, response curve over step input, time constant.</p> <p>2.3 Time response second order system: Brief concept of transient and steady state response, Response curve over unit step input, Performance characteristics: peak time, delay time, rise time, settling time, peak overshoot: definitions, formulae & significance, Characteristics equation, effect of damping factor.</p> <p>2.4 Steady state error: definition, position, velocity, accelerations, constants, steady state error over step, ramp, parabolic input: formulae & problems.</p>	10	16
03	<p>Stability Concept</p> <p>3.1 Concept of stability. Necessary condition for stability.</p> <p>3.2 Routh's stability criteria: Formation of Routh's array, condition for stable system, limitations, problems</p>	04	08

SECTION 2			
Sr. No.	Name of the Topic	Periods	Marks
04	<p>Root locus Techniques</p> <p>4.1 Root locus concept</p> <p>4.2 Construction of root locus</p> <p>4.3 Problems based on the construction of root locus. (simple problems: can be up to third order)</p> <p>4.4 Condition of stability for root locus</p>	07	12
05	<p>Frequency domain analysis</p> <p>5.1 Frequency response: basic concept, frequency response curve. Frequency response characteristics: resonance frequency, resonance peak, Bandwidth, phase and gain margin: definitions significance, formulae.</p> <p>5.2 Polar plot: Basic concept, procedure, simple problems.</p> <p>5.3 Bode plot: Basic concept, procedure, magnitude and phase plot for different standard functions, simple problems, condition for stability.</p>	10	16
06	<p>System Components</p> <p>6.1 Potentiometers: Types, characteristics, construction, sensitivity. Servo-potentiometers. Potentiometer as a error detector, transfer function, advantages, application.</p> <p>6.2 Servo amplifiers: Diagram, working, applications.</p> <p>6.3 Compensator: basic concept of lag and lead compensator.</p>	07	12

EXPERIMENT LIST

1. To draw the input-output characteristics potentiometer as an error detector.
2. To observe the forward/reserve direction movement of stepper motor.
3. To plot the characteristics (angular displacement v/s winding voltages) of synchro transmitter.
4. To plot the graph of angular displacement of rotor of synchro transmitter and angular displacement of rotor of synchro receiver (follow up system).
5. To plot the speed-torque characteristics of AC servomotors.
6. To plot speed-torque characteristics of DC servomotor.
7. Observe the output and functioning of open loop control system.
8. Observe output and functioning of closed loop temp. control system/refrigerator unit.
9. To plot the graph and understand the types: type 0, type 1, type 2, control system.
10. To control the position of DC position control system.
11. To plot the graph of step, ramp, parabolic test signal.
12. To observe the output of lag/lead network.

Practical using MATLAB software

1. Plot all standard signals
2. Plot a Bode plot (Frequency Response)
3. Plot 0, 1 and 2 order systems.
4. Plot P, PI and PID Controller

IMPLEMENTATION STRATEGY

1. Teaching plan
2. Minimum 10 practicals / assignments
3. Industry visit.

REFERENCES

Sr. No.	Author	Title	Edition	Year of Publication	Publisher & Address
1.	J. J. Nagrath and M. Gopal	Control System Engineering	2 nd		Newage International Pvt. Ltd.
2.	K. Tandan, A. Subba Rao, Parag Desai, S. K. Kulkarni,	Control Engineering	2 nd		Dhanpat Rai Sons.
3.	Curtis D. Johnson	Process Control Instrumentation Technology	7 th		PHI

Details of the references to be/ will be provided by the concerned teacher

PROGRAMME TITLE: Diploma in Electronics & Telecomm. Engineering											
SEMESTER : Four											
Course Code	Course Title	Prerequisite	Credits			Examination Scheme					
			L	P	Total	Theory		PR	OR	TW	Total
						T H	T S				
ET 11415	CIRCUITS AND NETWORKS	ET-11112	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:

This subject comes under the Basic Technology 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 is also essential.

SECTION 1			
Sr. No.	Name of the Topic	Periods	Marks
01	D.C. CIRCUITS 1.1 Growth and Decay of current in L-R and C-R circuits, concept of "Time - Constant".	6	10
02	A.C. CIRCUITS : 2.1 Ohms Law applied to A.C. flowing through combinations of R,L,C. 2.2 The phasor-diagrams, Power Factor of A.C. circuits. Resonance - Types, Selectivity, 'Q'-factor and 'Bandwidth'.	09	15

03	<p>CIRCUIT THEOREMS (FOR AC AND DC) : 3.1 Kirchoff's Law, Mesh Analysis and Nodal Analysis in the steady-state conditions. 3.2 Thevenin's, Norton's and the Superposition Theorems. 3.3 Maximum Power Transfer Theorem.</p>	09	15
SECTION 2			
04	<p>FOUR TERMINAL PASSIVE NETWORKS : 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', 'Pi' 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 Equivalence/ Conversion of any complex network to a three element section. 4.6 Voltage dividers and Attenuators, their frequency correction.</p>	12	20
05	<p>PASSIVE FILTERS 5.1 C-R type Filters and their attenuation slope constant 'K'. 5.2 Low pass-High pass Filters, their cut-off frequency and roll-off in dbs per octave, attenuation and phase angle for pass and stop bands, 5.3 Design of proto-type section. 5.4 Lead and Lag networks. 5.5 Constant 'K' Filters – 5.5.1 High pass and 5.5.2 Low pass types. 5.6 M-derived filters and their matching sections, composite filters. 5.7 Mismatch and effect of coil resistance on the filter characteristics. 5.8 Bandstop filters - constant K and m-derived types, 5.9 Twin-T networks 5.10 Notch Filters 5.11 Crystal filters 5.12 Equalizers - their design and insertion loss, characteristics. 5.13 Simple Numerical examples based on filter design.</p>	12	20

EXPERIMENT LIST :

1. Variation of reactance with frequency in L and C.
2. Measurement of Inductance and Capacitance.
3. Measurement of Mutual Inductance.
4. Series Resonance.
5. Parallel Resonance.
6. Variation of Q with frequency.
7. Attenuator Pads - 'T' and 'Pi' types.
8. Study of Thevenin's and Norton's Theorems.
9. Study of Maximum Power Transfer Theorem
10. Design of Low pass and High pass Filters.

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			

Details of the references to be/ will be provided by the concerned teacher

PROGRAMME TITLE: Diploma in Electronics & Telecom. Engineering											
SEMESTER : Four											
Course Code	Course Title	Prerequisite	Credits			Examination Scheme					
			L	P	Total	Theory		PR	OR	TW	Total
						T H	T S				
ET 11416	SOFTWARE SIMULATION TECHNIQUES (No Theory exam)	ET-11314	-	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.

Examples for Practice / Practicals

- 1) Introduction to MATLAB – Mathematical functions
- 2) Introduction to MATLAB – Logical functions
- 3) Plot Diode Characteristics
- 4) Plot BJT and UJT Characteristics
- 5) Plot FET Characteristics
- 6) Plot SCR Characteristics
- 7) Amplitude Modulation and Demodulation
- 8) Frequency Modulations and Demodulation
- 9) Frequency response of active low pass and high pass filters using op-amp
- 10) Frequency response of active band pass and band reject filters using op-amp

REFERENCES

Choice of student or as suggested by the concerned teacher

**Suggested New Replacement Examples for Practice/ Practicals by teacher:
(TO BE APPROVED AT THE EXTERNAL BOS TO BE HELD IN
NOVEMBER/ DEEMBER 2013)**

- 1) Creating, saving and executing a script file.
- 2) Creating and executing a function file.
- 3) Creating and printing sample plots.
- 4) Calculations using MATLAB – Arithmetic, Exponential, Logarithmic, Trigonometric and calculations involving complex numbers.
- 5) Creating and working with arrays of numbers.
- 6) Matrices and Vectors – Indexing a matrix, matrix manipulations – transpose, appending and deleting row or column, matrix operation.
- 7) Specialized 2-D plots.
- 8) Amplitude modulation.
- 9) Frequency modulation.
- 10) Continuous and Discreet Time Signals.

PROGRAMME TITLE: Diploma in Electronics & Telecom. Engineering											
SEMESTER : Four											
Course Code	Course Title	Prerequisite	Credits			Examination Scheme					
			L	P	Total	Theory		PR	OR	TW	Total
						T H	T S				
ET 11417	MECHATRONICS (No Theory exam)		2	2	4	-	-	-	50	50	100
The assessment of the term work is Internal.											

PROPOSED SUBJECT TO BE FINALIZED AT THE BOARD OF STUDIES MEETING TO BE HELD IN NOVEMBER - DECEMBER 2013

RATIONALE:

At a basic level this subject of Mechatronics comes under the Applied Technology group; (at an advanced level it can be considered to come under Diversified Technology). Electronic sensors, transducers and control systems have made their presence felt in all branches of engineering and diversified technology (for example Robotics, Bio-medical Engineering, etc.) and there has been a rapid shift towards the integration and merging of electronics into all other major areas of technology. The subject strives to highlight the importance of integration and amalgamation of electronics with mechanical systems, focusing on sensors, transducers, and the link that is established by electronics with mechanical systems, especially for sensing purposes at the front end and control purposes at the back end. The objective of this subject is to provide a platform to students to design and build a simple mini project which integrates elements and concepts related to both, electronics engineering as well as mechanical engineering.