# COLLEGE OF ENGINEERING, OSMANABAD.

Ref. No.COE/ESTT/2008/

Date :- 09/06/2008

То

# The Deputy Registrar,

Dr. B. A. M. University,

Aurangabad.

# Sub :-Regarding the structure and syllabus of T.E. (E&TC/E&Comm/EC/IE).

Respected sir,

With reference to the subject cited above, I am herewith submitting the structure and syllabus for T. E. (E&TC/E&Comm/EC/IE) run by Engineering Colleges affiliated to Dr. B. A. M. U. Aurangabad.

This is for your kind consideration.

Thanking you,

Yours faithfully,

Prof. Prashant S. Kolhe Chairman, Electronics Board Dr. B.A.M.U.Aurangabad.

CC: 1. O/c PSK/ggs Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

# DR. BABASAHEB AMBEDKAR

# MARATHWADA UNIVERSITY

AURANGABAD

# **REVISED SYLLABUS**

# TE (E&TC/E&Comm/EC/IE)

With Effect from July-2008

## SUBMITTED BY

Prof. Prashant S. Kolhe Chairman (Board of Study in Electronics) Dr. B.A.M.U Aurangabad

# Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.

Revised Structure of T. E. (Electronics & Telecommunication / Electronics & Communication / Electronics / Industrial Electronics)

Part – I									
Sr. No	Subject Code	Name of the subject	Teaching Scheme		Examination Scheme				
	0000		Th.	Pr	Total	PP	TW	Pr.	Total marks
1.	EC301	Electromagnetic Engg. and Antenna Theory	04	-	04	100	-	-	100
2.	EC302	Power Electronics	04	02	06	100	50	-	150
3.	EC303	Microprocessor & Peripherals	04	02	06	100	-	50	150
4.	EC304	Signal Coding and Estimation Theory (E&TC, E&Comm.)	03	-	03	100	-	-	100
5.	EC305	Analog Integrated Circuit and Applications	04	02	06	100	-	50	150
6.	EC306	Microelectronics (EC,IE)	03	-	03	100	-	-	100
7.	EC307	Electronic System Design Lab.	01	02	03	-	-	50	50
8.	EC308	Software Lab.	-	02	02	-	50		50
		Total	20	10	30	500	100	150	750

## Part – II

Sr. No.	Subject Code	Name of the subject	Teaching Examination		tion So	cheme			
			Th.	Pr.	Total	PP	TW	Pr.	Total marks
1.	EC309	Digital Communication (EC, E&TC, E&Comm.)	04	02	06	100	-	50	150
2.	EC310	Digital Signal Processing	04	02	06	100	50	-	150
3.	EC311	Microcontroller &	04	02	06	100	-	50	150
		Advanced Processors							
4.	EC312	Electronic Measurement	02		02	50	-	-	50
5.	EC313	Feedback Control System	04	02	06	100	-	50	150
6.	EC314	Industrial Drives & Control (IE)	04	02	06	100	-	50	150
7.	EC315	Business Management	02	-	02	50			50
8.	EC316	Seminar	-	02	02	-	50	-	50
		Total	20	10	30	500	100	150	750

## Prof. Prashant Kolhe

Chairman Board of Studies in Electronics Dr. B.A.M.U.Aurangabad

т	EC301-Electromagnetic Engineering and Antenna Theory	
L	ectures: 4 Hrs. / Week Paper: 100 Marks	
P	ractical: Practical:	
	Term Work:	
	Topics and Contents	lours
1	Coulomb's Law and Electric field intensity :	05
	Coulomb's Law, Electric field intensity, calculation of Electric field intensity	
2	for various charge distributions, streamlines and sketches of field	00
2	Electric flux density Gauss's Law :	09
	operator and divergence theorem	
	Energy and potential :	
	Energy expended in moving a point charge in an Electric field, line integral,	
	potential and potential difference, calculations of Electric field of both point	
З	Conductors Dielectrics Canacitance :	03
5	Current and current density, continuity of current, conductor properties,	00
	Dielectric material and properties, capacitance, calculation of capacitance of	
	various configurations, method of images	
4	Poisson and Lap lace's Equation's :	03
	product solution of Laplace's Equation	
5	Steady Magnetic Field :	05
	Biot savart law, Amperes circuital law, curl of H, stok's theorem, Magnetic	
	flux and flux density, scalar and vector magnetic potentials of steady	
6	magnetic field lines Time Varving field and Maxwell's Equations :	03
0	Faradays law, concept of displacement currents. Maxwell's Equations in	05
	point form, Maxwell's in point form, Maxwell's Equations in Integral form,	
	Boundary conditions and significance of Maxwell's Equations	
7	Uniform plane Waves :	05
	Uniform plane waves in time domain in free space, sinusoidally time varying	
	uniform plane. Waves in dielectrics and conductors, refection of uniform	
	plane waves significance of plane waves, polarization of waves	
8	Pointing Vector and flow of power :	03
	Pointing theorem, power flow for a plane wave, power flow in a concentric	
	cable, pointing vector about R-C lines, neterogeneous average and complex	
9	Antenna Theory:	04
	Review of basic of antennas, RF/HF antennas for transmission and	
	reception.	
	Types of antennas: Horn, Slot, parabolic, End fire antenna, microstrip,	
Rec	nencai anu proadpand antennas.	
1.	Engineering Electromagnetic – William H. Havt Tata MC-Graw Hill Publication.	
2.	Elements of Engineering Electromagnetic – Nanapaneni Narayana Rao Prentice Hall	of
	ndia Publication.	

- Electromagnetic Waves and Radiating Systems Edward C. Jordan, Keith G Balmain
   Electromagnetic with applications Kraus / Fleisch, MC graw Hill.

- Elements of Electromagnetic fields by S. P. Seth Dhanpat Rai & Co.
   Electromagnetic fields and waves by K. D. Prasad, stya prakashan.
- 7. Theory and problems of "Electromagnetic" 2e, Schaum outline's, J. A. Edminister.
- 8. Elements of Electromagnetic- Matthew N.D.Sadiku, OXFARD UNIVERCITY PRESS.
- 9. Antenna & Wave prapogation by K.D. Prasad

			EC302-Powe	r Electronics		
Tea	ching Sch	eme :		Exam Schem	e :	
Lect	tures :	4 Hrs. / Week		Paper:	100 Marks	
Prac	ctical :	2 Hrs. /Week		Practical:		
				Term Work:	50	
			Topics and	Contents		Hours
1	Thyristor	Power Devices:		Contento		08
	Construct character transisto	tion and syml ristics, performar r, Power MOSFET vices	bol, operati nce paramete r, IGBT, GTC	on, steady ers of followin ), S.C.R, DIAC	state and switching ng: Power diode, Power C, TRIAC Applications of	
2	Triagerin	and Commutat	ion of SCR			06
	Necessity opto-cou commuta	y of electrical is pler firing circuit ation techniques-	olation for the for S.C.R., R circuits and p	riggering circu , R-C, UJT trig principle of ope	uits, pulse transformer, gering circuits, different eration	
3	AC Powe	r Control				06
	Principle waveform with R a	of integral cyc ns, operation an and RL loads, cyc worters	cle and pha d analysis o cloconverters	ase angle con f single phase s, reduction	ntrol, Circuit diagram, e AC voltage controller of output harmonics in	
4		A Converters				06
•	Single pl	hase & three phase	se controlled	converters, fu	Il controlled converters,	00
	dual cor	nverters, effect	of load an	d source ind	uctance, power factor	
	improver	ment techniques				
5	DC Chop	pers				04
	Principles	s of operation of	step-up and	step-down ch	oppers, 2 - Quadrant &	
	4 - Quad	urant choppers, v Itor	voltage and d	current commi	utated choppers, use of	
6	Inverter	s				04
Ũ	Series in	, verter, parallel in	verter, PWM	Inverter (vari	ous PWM techniques for	01
	voltage o	control and harmo	onic eliminati	on) & its contr	ol	
7	Induction	n Motors and Con	trol	-		06
	General	principle, constru	ction, perfor	mance charact	teristics, starting torque	
	& startin	ig torque variation	on with diffe	erent factors,	stator voltage and V/f	
	CONTROL I	nethods, Non- d	rive applicat	ions of power	r electronic converters-	
Dractic	UPS, electric al Evamir	ation:	- induction ne	eating		
The pr	actical ex	amination shall co	onsist of perf	orming an exr	periment on the practical	work
done c	luring the	course, the reco	rd of the exp	eriments subm	nitted by the candidate ar	nd
Viva-v	oce basec	1 on the syllabus.	·			
The as	sessment	: will be based on				
1.	Performi	ng an Experiment				
2.	Record o	t experiments sul	bmitted by th	ie candidate.		
ۍ. Lict of	VIVa-VOC	e on the syllabus.				
(Minim	um eiaht	experiments sho	uld be condu	cted during th	e course)	
1.	Study of	V-I characteristic	s of SCR. DI	AC, TRIAC.		
2.	Study of	V-I characteristic	s of power s	emiconductor	devices: GTO, MOSFET, I	GBT.

- 3.
- 4.
- Study of R and R-C firing circuit. Commutation circuits: Class A, B, C, D. Study of 1-ph half controlled and full controlled converter. (R & RL Load) 5.

- 6. Application of phase control using SCR/TRIAC.
- 7. Study of chopper circuit ( CLC, TRC techniques )
- Study of Series Inverter. 8.
- 9. Study of Parallel Inverter.
- Study of UPS. 10.

### **Recommended books:**

- M.H.Rashid, "Power Electronics", PHI
   V.R.Moorthi "Power Electronics", Oxford university press.
- 3. M.Ramamoorthy, "Introduction to thyristor and their applications", East-West Press
- 4. P.C.Sen, "Power Electronics", Tata McGraw Hill
- General Electric, "SCR Mannual", PHI
   Dr.Bimbra, "Power Electronics", Khanna Pub. N. Delhi
- 7. Edward Hughes, "Electrical Technology", ELBS/Longman
- 8. M.D. Singh, K.B. Khenchandani "Power Electronics", TMH

EC 303 - Microprocessor and Peripherals				
<b>Teaching Sch</b>	eme :	Exam Scheme	e :	
Lectures :	4 Hrs. / Week	Paper:	100 Marks	
Practical :	2 Hrs. /Week	Practical:	50	
		Term Work:		

#### Topics and Contents

Introduction to 8 – bit Microprocessor: Basic block diagram of microprocessor, Architecture trends of microprocessor, Classification of computers, Evolution of microprocessors, Programming Development Tools (Editor, Debugger, Assembler, etc.). Internal Architecture of Intel 8085, Block Diagram, Registers, Internal Bus Organization, Pin Description, Control Signals, Interrupt structure

- 8085 Programming: Instruction set, classification of instructions, Addressing 10 Modes, Concept of looping, indexing & Flowcharting. Timing Diagrams of 8085. Programs based on Data Transfer, Arithmetic & Logical operations, Code Conversion, Block Transfer. Stack & Subroutines. Delay subroutines (with a register and register pair)
- Peripherals and Interfacing: 8255 Programmable Peripheral Interface, 8253 12
   Programmable Interval Timer, 8257 DMA Controller, 8259 Programmable
   Interrupt Controller, 8279 Programmable Display Keyboard Controller.8251
   LED, 7 segment display, relay, keyboard, stepper motor, ADC & DAC, Memory interfacing.
- 4 **Microprocessor 8086**: Architecture, Memory address space & data 10 organization; Segment Registers & Memory Segmentation, I/O Address space; Addressing Modes. Comparison of 8086 & 8088. Basic 8086/8088 configuration; Minimum mode & Maximum Mode.

#### Practical Examination:

The practical examination will be of three hours duration. It will consist of one experiment conducted during the course and an oral examination based on the syllabus.

### List of Experiments :

Any eight experiments from the list given below.

#### Software based

01) Arithmetic operation on two 8 bit numbers

02) Addition and subtraction of two 16-bit numbers.

- 03) Operation on two 16-bit BCD numbers. (Using DAA instruction.)
- 04) Block transfer of data bytes.
- 05) Searching of the smallest and largest element in a block of data.
- 06) Sorting the elements of a block of data in ascending and descending order.
- 07) Converting 2 digit numbers to their equivalents. a) BCD to HEX and b) HEX to BCD

08) Floating point operations

### Hardware Based:

Any four experiments from the list given below.

- 01) Program controlled data transfer using 8255 PPI.
- 02) Interfacing 7 segment LED display using 8255A in static and dynamic mode.
- 03) Interfacing keyboard-using 8279.
- 04) Interfacing display-using 8279.

#### Hours

05) Interfacing ADC 0808/0809.

06) Interfacing DAC 0808.

07) Interfacing stepper motor with microprocessor using 8255A – in half and Full Excitation.

08) Interfacing of 8253 / 8254.

09) Interfacing of 8251.

# Recommended books:

Microprocessor Architecture, Programming and Applications-Gaonkar,

Willey Eastern Publications.

2) Microprocessor and Programmed Logic--K.L.Short, 2nd Edition Pearson Education.

3) Fundamentals of Microprocessor & Microprocomputers-- B. Ram, TMH.

4) Microprocessor and Digital System – Dougles Hall- TMH.

5) Intel's Data Manuals.

6) Microprocessor H/W Interfacing and Application – Bray – CBS

7) Microprocessors and Peripherals—B. Venkatramani, TMH.

08) Microprocessors and Interfacing Programming and Hardware. By - Douglas V. Hall.

09) The 8086/8088 family: Design, Programming, and Interfacing by – John Uffenbeck. 10) Ajoy Kumar Ray & Kishor M.Bhurchandi, "Advance Microprocessors & Peripherals" (Architecture, Programming & Interfacing), Tata Mcgraw-Hill Publishing Company Limited, New Delhi.

Тор	EC304-Signal Coding and Es	stimation Theory (E&T	C/E&C)	
Lect	cures: 3 Hrs. / Week	Paper:	100 Marks	
Prac	tical:	Practical Exam.:		
		Term Work:		
	Topics and	d Contents		Hours
I	Source Coding Introduction to probability: Properti- probability and information, Introduct and information, Information Measur Information, Source coding theorem, coding, The Lempel-Ziv algorithm, Ru	es and theorems., R ion to information the re, Average Informati Shannon-Fanon Algo In length coding ,	elation between eory, Uncertainty on and mutual rithm, Huffman	05
2	Channel Capacity and coding Introduction, Type of sources and capacity, Channel coding, Informatheorem, the Shannon limit	channels, Channel r tion Capacity Theor	nodels, Channel rem, Shannon's	05
3	Linear block codes. Introduction to error correcting codes of linear block codes, equivalent co decoding, perfect codes, hamming co distance separable codes	s, basic definitions, m odes, party check m odes, optimal linear	atrix description atrix, syndrome code, maximum	05
4	<b>Cyclic codes:</b> Introduction to cyclic codes, polyr polynomials, a method for generatin cyclic codes, circuit implementation for Fire codes, Golay codes, BCH Cod Reed- Solomon Codes, Nested Codes	nomials the division og cyclic codes, matri or cyclic codes, Burst es, Cyclic Redundanc	algorithms for ix description of error correction, ty Codes (CRC),	07
5	<b>Convolution codes and coding method</b> Introduction to convolutional code Polynomial description of convolutional convolutional codes, The generation convolutional codes, Viterbi decoding to TCM, the concept of coded modulation decoder, performance evaluation of Application	s: es, Tree codes and tional codes, distan ting functions, matrix of convolutional code tion, mapping by set p wan channel, Tcm for	t trellis codes, ce notions for description of es, Introduction partitioning, Tem fading channels	08
6	<b>Estimation Theory:</b> Basic concepts and criterion, Baye Estimation, Maximum a priori Estimati	es Criterion, Maximu on, Least Square estir	m Likely Hood	03
Recom	imended books:	untersure Deuteur D	TMUT 2002	
上. つ	N Abramson – Information and Cry	ing Mc-Graw Hill	bose, IMHI, 2002.	
∠. 3.	M.Mansurpur- Introduction to infor	mation Theory. Mc-Gr	aw Hill, 1987	
4.	R.B.Ash- Information Theory, Pren	tice- Hall, 1970.		
5.	Simon Haykin – Digital Communica	ation, John Willey, 199	98.	
6.	K.Sam Shanmugam – Digital and 1994.	Analog communicatio	on systems, John	Willey,
7.	Analog and digital communication,	2/e, Schaum's Outlin	es, Hwai P Hsu, TN	1H

Teaching Scheme :		Exam Scheme :		
Lectures:	4 Hrs. / Week	Paper:	100 Marks	
Practical:	2 Hrs. /Week	Practical :	50 Marks	
		Term Work:		

#### **Topics and Contents**

#### 1 **Op-Amp Fundamentals :**

Block diagram of Op-Amp (Basic building blocks), Basic differential amplifier using transistors it's operation, DC & AC analysis, current sources, current mirrors, Active load, Differential to single ended conversion

#### 2 **Operational Amplifier :**

Op-Amp, Parameters & characteristics, defination, & measurement, Ideal Op-Amp, equ. Circuit, volt. Transfer curve, open & closed loop, Inverting & Non-inverting configurations, Concept of virtual shorts & grounds. Nonideal (AC & DC) Op-Amp behavior & its effect on performance offset nulling techniques

#### 3 **Op-Amp Linear Applications :**

Voltage follower, Summing amplifier, Scaling & averaging amplifier, Instrumentation amplifier & applications, V to I to V converter, Integrator & Differentiators, Practical considerations, peak detector, log & antilog amplifiers and analog multipliers

#### 4 **Op-Amp Nonlinear Applications :**

Comparators, Limitations of Op-Amp as comparator, Schmit trigger, Comparator IC such as LM 339, Sample & hold circuit, Window detector, Clipper & clamper, Square wave generator using op-Amp Precision Rectifier

## 5 Signal Generators :

Multi-vibrators using timer IC-555 & Op-Amp Study of function generator IC-8038, XR2206, Study of VCO-IC 566.

### 6 Active Filter Design :

Advantages of active filters, Filter class-Butterworth, Chebyshev, Bessel, Elliptic. Design of active filter of LPF, HPF, BPF, of 1st order & 2nd order. Buterworth filter.

### 7 Phase Locked Loops :

Block diagram of PLL, Block diagram of PLL IC 565, Definations – free running frequency, lock range, capture range, pull in time. Transfer characteristic of PLL

### 8 Voltage Regulator :

Linear IC voltage regulator, Need for voltage regulation, fixed voltage regulator (78XX, 723), adjustable voltage regulator: (723, LM317, LM337) Switching regulator IC 78S40

### LIST OF EXPERIMENTS:

- 1. Op-Amp parameters measurements offset voltage, Bias current, CMRR, Slew rate, Output resistance.
- 2. Op-Amp Applications I: Integrator & Instrumentation Amplifier.
- 3. Op-Amp Applications II: Comparator, Schmitt Trigger.
- 4. Design, Simulate, Build & Test Active Filters.
- 5. Design, Build & Test a square wave generator using Op-Amp.
- 6. To study the operation of IC 565 as PLL.
- 7. Implementation of IC 723 as basic high / low voltage regulator.

Hours 04

06

05

05

04

05

#### 8. To verify precision rectifier using Op-Amp

#### Practical Examination:

The practical examination will be of three hours duration. It will consist of one experiment out of the list of the experiments specified and an oral examination based on the syllabus. **Recommended books:** 

- 1. Coughlin, Driscol, Operational Amplifiers & Linear Integrated circuits, PHF, Fourth Edi.
- 2. D. Roy Choudhary, Shail Jain, Linear Integrated Circuits', New Age International.
- 3. Ramakant Gaikwad, 'Op-Amp & Integrated circuis', PHI.
- 4. G. B. Clayton, Operational Amplifiers' ELBS Edition.
- 5. Govind Daryananj, 'Principles of Active Network Synthesis & Design,' John Wiley & Sons.
- 6. Servio Franco,' Operational Amplifiers & Analog Integrated circuits'

		EC306-	MICROELECTRO	NICS (EC	C/IE)	
Теа	ching Sch	eme :	Exam	Schem	e :	
Lec	tures :	3 Hrs. / Week	Рареі	r:	100 Marks	
Pra	ctical :		Pract	ical:		
			Term	Work:		
		-	onics and Conto	nto.		Hours
1	IC Techn	ology/	opics and Conte	nts		
T	Somicon	ductors and dovice	s an overview	, of IC	Tochnology and its	05
	requirem	ents Unit stens use	d in IC Technolo		reciniology and its	
2	Clean roo	nm		99		06
2	Environm	ent for VISI Techn	ology · Clean ro	om and	l safety requirements	00
	Wafer cle	eaning processes. C	rystal growth, i	mpurity	incorporation through	
	diffusion	and ion implantatio	n, autterina	inpuncy		
3	Oxidation	n, Etching	, geoceang			06
	Oxidation	n : Kinetics of Silico	n dioxide growth	n both fo	or thick and thin films,	
	Oxidatior	n technologies in VL	.SI , Plasma etcl	hing and	d RIE techniques; RTP	
	technique	es for annealing, gro	wth and deposit	ion of va	arious films.	
4	Lithograp	ohy				06
	Lithograp	ohy : Photolithograp	hy, E-beam litho	graphy a	and newer lithography	
	technique	es for VLSI, Mask ge	eneration, PPR ar	nd NPR		
5	CVD					06
	Chemical	Vapor Deposition	techniques: CVD	) technic	ques for deposition of	
	polysilico	n, silicon dioxide, s	llicon nitride and	i metal i	ilms; Epitaxial growth	
6	of silicon	. Metal film depositi	on : Evaporation	and spu	ittering techniques	05
6					tachnalagiag	05
Docor	Process II	heeks	s, CMOS; Advanc	lea MOS	technologies.	
Recor	mended	DUUKS:				
Text	Books :					

1. Plummer, Deal, Griffin, 'Introduction to semiconductor fabrication', Prentice Hall publication – 2001. ISBN No 0130224049

#### **Reference Books :**

- 1. Richard Jaeger, 'Introduction to Microelectronic Fabrication', Prentice Hall, 2nd edition 2002.
- C.Y. Chang and S.M. Sze (Ed), 'ULSI Technology', McGraw-Hill, 1996.
   S.K.Gandhi, 'VLSI fabrication Principles', John Wiley Inc., New York, 1983.
- 3. Sadra/Smith,"Microelectronics circuits". Oxford Publication.

#### EC307- Electronic System Design Lab

Teaching Scheme :		Exam Scheme :	
Lectures:	1 Hrs. / Week	Paper:	
Practical:	2 Hrs. /Week	Practical Exam .:	50 Marks
		Term Work:	

#### Module 1: (12 hours)

#### Topics and Contents

- 1 **Rectifiers & Filters:** Design a Full wave centre-tap rectifier circuit with an LC filter to supply centre-tap 9V dc at 50 mA with a ripple factor of 0.02
- 2 **Voltage regulators:** Design a series voltage regulator for 15V at 100mA the unregulated power supply provide output of 25V and  $r_0 = 10\Omega$ .
- 3 **Voltmeters:** Design multi range Voltmeter using op-amp for the voltage of 0.1-1-10-100-1000V. Use moving coil instrument of  $5k\Omega$  internal resistance and  $50 \mu$  A full-scale deflections current. The total impedance of the meter should be greater than or equal to  $100M\Omega$ .
- 4 **Amplifiers:** Design a two stage RC coupled amplifier to meet the following specifications, Load resistor  $R_L = 3K\Omega$ , Source resistance  $R_S = 600\Omega$ , *output* voltage  $9V_{pp}$  with a supply voltage of 15 V, lower 3dB frequency is  $50 H_Z$ .
- 5 **Power amplifiers:** Design power amplifier using LM 380 for following specification,  $P_a = 1.5W$ ;  $R_L = 4\Omega$ ;  $BW = 30H_z to 15KH_z$ ;  $A_V = 50$ .
- 6 **Oscillators:** Design a Transistorized Colpitt's oscillator for the frequency of 1 Mhz and giving output voltage of  $1V_{(rms)}$ .
- 7 **Oscillators:** Design Wein bridge oscillator using IC 741 for frequency of  $1KH_z$  at peak output voltage of 14V.
- 8 **Multivibraters:** Design a 555 Astable Multivibrater to operate at 10kHz with duty cycle of 60%.
- 9 **Combinational Circuit:** Design a priority encoder.
- 10 Flip flops: Design JK flip flop and verify its truth table using NAND gate.
- 11 **Counters:** Design a BCD/Decade using IC74192 for the following specification, clear output to Zero, load (preset). Draw the o/p waveform for clear, load & count sequence and also interface the o/p of counter with FND display in order to check the count sequence
- 12 **Detector:** Design the diode detector circuit for AM wave with following specifications  $R_i = 10K\Omega$ ,  $f_m = 5KH_Z$ ,  $f_c = 455KH_Z$ ,  $m_a = 0.6$ .

The Practical work will be carried out by a student working on topic related to the electronics Telecommunication and allied fields. (At least eight experiments related to the above topics)

Module 2: (2 hours)

13 **Printed Circuit Board:** PCB design steps and concepts; also design PCB for any one of the above circuit.

Module 3: (2 hours)

14 **Introduction to Electronic System Design;** Packaging & Enclosures of Electronic System: Cooling in/of Electronic System; Electromagnetic Compatibility (EMC); Cabling of Electronic Systems; Grounding of Electronic Systems; Balancing & Filtering in Electronic Systems; Shielding of Electronic Systems; Protection Against Electrostatic Discharges (ESD).

#### Recommended books:

- 1. Op-Amp's and linear integrated circuits by Ramakant Gaikwad.
- 2. Fundamentals of digital electronics by Floyd.
- 3. Electronic Devices & circuit theory by Boylestad.
- 4. Electronic Instrument Design, 1<sup>st</sup> edition; by: Kim R. Fowler; Oxford University Press.
- 5. Noise Reduction Techniques in Electronic Systems, 2nd edition; by: Henry W. Ott; John Wiley & Sons.
- 6. Digital Design Principles& Practices, 3rd edition by: John F. Wakerly; Prentice Hall International, Inc.

#### EC308- SOFTWARE LAB (JAVA PROGRAMMING/.NET)

Teaching Scheme :Lectures :--Practical :2 Hrs. /Week

### Exam Scheme :

Paper:	
Practical:	
Term Work:	50
с II · · I	

The software lab will be based on one of the following languages

I .Java programming

II. .Net

# I .Java programming

#### Topics and Contents

#### 1 Java as a OOP (Object Oriental Programming) language

Features of OOP, OOP vs procedural language, Goals of Java programming language. Key features of Java, Difference between c++ & Java, The Java Virtual Machine (JVM), JVM run time environment, concept of Byte code, Garbage collection.

#### 2 Java Programming

The source file layout, compiling & running program, Primitive data type, Wrapper classes, variables, Type conversion & casting, operators & assignments, Arrays, Java classes & methods, Declaring objects, constructors, 'this' keyword. Overloading methods and constructor passing arguments using call by value & call by reference. Access control, understanding static.

#### 3 Inheritance & Multithreading

Basics using super, method overriding, dynamic method dispatch, Abstract classes, using final, Java thread model, The main thread ,(reating a thread, creating multiple threads, using Alive() & Join (), Thread priorities, synchronization, Interthread communication, suspending, resuming & stopping threads.

#### 4 Packages, Interfaces & Exception handling

Packages, Access protection, Importing Packages, Interfaces, Accessing implementations through interface references – Extending interfaces, classes versus Abstract class versus interface

Exception handling fundamentals, using try & catch, Exception types, multiple catch clauses, throw, throws, finally, Javas build in exceptions, Creating your own exception subclasses.

#### Term Work:

Assessment of term work should be done as follows

Continuous lab assessment

Actual performing Practicals in lab

Oral examination (Internally) conducted of the time of submission on the syllabus & practical performed

It shall consists at least 10 programs based on the above mentioned topics Or One mini project.

#### Recommended books:

#### Text Book:

Patric Naughton & Herbert Schildt, Java 2: The complete refrence third edition, Tata McGraw Hill.

#### Refrence Books :

Pragramming with Java A primer : E Balguruswamy,

# II.NET

#### 1. Introducing .Net

.Net framework overview, common type system, common language specification

Common Intermediate language, Just in time complier,.Net framework class library, Namespaces, Languages in .NET, Assemblies

#### 2. First VB.NET Program

The solution Explorer window, the class View window, the toolbox,

The output window, the task list window

#### 3. Data types, operators and control statement

Variables and Data types assignment and arithmetic operators, comparison and logical operators, controlling the flow of program, controls structures, loops, arrays, procedures.

#### 4. Creating Menus and using dialog boxes

Menus, multiple document interface (MDI), context menu, rich text box, colour dialog control, font dialog control.

#### 5. Object Oriented concepts in VB.NET

Boxing and unboxing, read only and write only properties, adding methods to class, classes with constructor, Assemblies that access C# Program, names spaces inheritance, overriding properties and methods, shadows statement, polymorphism

#### 6. Events delegates and exception handling

Events in class, delegates, single cast delegates, Mmulticast delegates, exception try, catch, finally, end try, try-catch, multiples catch, Nested try statement, try finally

#### 7. Data Access with ADO.NET

Special features of ADO.NET, Difference between ADO and ADO.NET, connection , commands – execute reader, execute query, execute scalar, using data grid, complex data binding.

### 8. Web Application with VB.NET and ASP.NET.

First ASP.NET application, server controls, validation summary controls, ADO.NET and data binding.

Text Books

- 1 VB.NET P.Radhaganesal SCITECH PUBLICATION.
- 2. Visual Basic .Net: Tps & Techniques, Author: Jamsa, ISBN: 0-07-052919-1

Edition: 01, Publisher: Tata McGraw- Hill

3. Visual Basic.Net : A Beginners Guide Author: KANT, TMH.

4. The Complete reference as P-NET – Mathew Mac Donald TMH PUBLICATION.

#### Term-Work:-

It shall consist of at least one mini project package based on above syllabus. Assessment of term work should be done as follows:-

\*Continuous Lab Assessment

\*Actually performing practicals in laboratory

\*Oral Examination (Internally) conducted at the time of submission on the syllabus and practicals performed.

**Prof. Prashant S. Kolhe Chairman** Board of Study Dr. B. A. M. U. Aurangabad

EC309-E	Digital Communication	
eme :	Exam Scheme :	
4 Hrs. / Week	Paper:	-
2 Hrs. /Week	Practical Exam.:	Ę
	Term Work:	-

100 Marks 50 Marks

#### **Topics and Contents**

Hours 06

**Introduction:** Differences between digital and analog communication systems. Block diagram of digital communication system, Bandwidth of digital data and bandwidth dilemma. Review of Random variables & Stochastic process.

2 **Digital Transmission of Analog Signals:** Introduction, Sampling Theory and Practices, Sampling Theorem, Ideal Sampling and Reconstruction of low-pass signals, the Uniform sampling theorem for band-pass signals, Practical Sampling.

#### 3 Digital Coding of Analog Waveforms:

Digital pulse Modulation, Uniform Quantization, Non-uniform Quantization, Quantization noise, Companding, coding, Digital-formats, Decoding, Regeneration, Differential Pulse Code Modulation, Delta Modulation, Quantization noise, Time Division Multiplexing, TI System.

- Inter symbol Interference and it's Cures: Base-band Transmission of Binary Data, The Inter symbol interference problem, Ideal solution, Raised Cosine Spectrum, Correlative-Level Coding, Base-band transmission of M-array Data, Synchronization & Framing.
- 5 **Spread Digital Modulation Techniques:** Binary Modulation Techniques, ASK, P

Binary Modulation Techniques, ASK, PSK and ESK, Generation and Detection of Binary Modulated waves, Quadrate Shift Keying, Minimum Shift Keying.

#### 6 Introduction to Spread Spectrum Techniques:

A model of Spread Spectrum digital communication system, direct sequence spectrum signals, Frequency Hopped Spread Spectrum signals, Slow Frequency and Fast Frequency Hopping.

#### List of Experiments :

- 1. Verification of sampling theorem using flat top sampling.
- 2. Study of TDM.

**Teaching Scheme :** 

Lectures:

Practical:

1

4

- 3. ASK Generation & detention.
- 4. FSK Generation & detention.
- 5. PSK Generation & detention.
- 6. DPSK Generation & detention.
- 7. QPSK Generation & detention.
- 8. Study of PCM Generation & detention.
- 9. Study of Delta Modulation

#### Recommended books:

- 1. An introduction to Analog and Digital Communication S. Haykin, John-Wiley.
- 2. Digital and Analog Communication Systems K. S. Shanmugam, John-Wiley.
- 3. Digital communications, 4<sup>th</sup> Ed, John G Proakis, McGraw Hill.
- 4. Digital Communications, Simon Haykin John-Wiley, 1998.
- 5. Principles of Communication Systems, 2/e, Taub Schilling. TMH.

06

08

06

08

EC310-Digital Signal Processing					
Teaching Scheme : Exam Scheme :					
Practical: 2 Hrs. / Week Paper. 100 Marks					
Term Work: 50 Marks					
Topics and Contents	Hours				
1 Introduction:	03				
Basic elements of DSP and its requirement, Advantages of digital over analog signal processing. Analog-to-Digital and Digital-to-Analog conversion.					
2 Z-Transforms:	04				
Definition and properties, significance of ROC, Poles and zeros, Inversion of					
the Z-transforms, Analysis of LTI systems in the Z-domain.	06				
Definition and properties of DET IDET and Linear filtering methods based	06				
on DFT, FFT algorithms, Frequency analysis of discrete time signals, Gortzel algorithm, relation between DFT and Z-transform.					
4 IIR Filter design:	06				
Filter design methods- Approximation of derivatives, Impulse invariance,					
billnear transformation, characteristics of Butterworth, chebysnev,					
Lattice and Lattice-ladder structures.					
5 <b>FIR Filter design:</b>	06				
Symmetric and Antisymmetric FIR filters, design of FIR filters using					
windows, frequency sampling methods, Alteration theorem in equiripple					
inear phase FIR filters, FIR differentiators, FIR filter structures-Direct form					
6 Multirate DSP:	06				
Introduction, Decimation by factor D, Interpolation by factor I, sampling					
rate conversion by a rational factor I/D, filter design and implementation for					
sampling rate conversion Direct form FIR filter structures, Time variant filter					
structures, Sub band coding of speech signals, over-sampling A/D and D/A, wavelet transform					
7 Analysis of Finite world length effect:	06				
Quantization process and errors, Analysis of coefficient quantization effects,					
A/D conversion, Noise analysis, Analysis of Arithmetic round-off errors,					
Dynamic range scaling, signal to noise ratio in low order IIR filters, Low					
table limit cycles in IIR digital filters. Round-off errors in FET algorithms					
Desirable features and architecture of DSP processor.					
8 Applications of Digital Signal Processing:	03				
Dual tone multi frequency signal detection, musical sound processing,					
digital FM stereo generation, application to speech: channel vocoder,					
Term Work					
Term work will consist of record of eight experiments out of the following and the					
assessment will be based on					
1 Performing an experiment					
<ul> <li>2 Record of experiments submitted by the candidate</li> <li>3 Viva-Voce on the syllabus</li> </ul>					
List of Experiments:					

- 1. Zero-pole analysis using transfer function, zero-pole-gain
- 2. Partial fraction expansion and second order sections and convolution matrix.
- 3. Spectral analysis
- 4. FFT based time frequency analysis
- 5. IIR filter design Butterworth and chebyshev type I and type II
- 6. FIR filter design Linear phase and windows.
- 7. Illustration of Decimation and Interpolation process.
- 8. Computation of Output Noise
- 9. Dual-Tone Multi-frequency Tone Detection

Any other experiments Based on the above syllabi.

#### Recommended books:

- 1. J.G. Proakis, D.G. Manolaakis, "Digital Signal Processing", PHI.
- 2. Chi-Tsong Chen Digital Signal Processing Oxford university press.
- 3. A.V. Oppenheim, R.W Schaffeur, "Discrete-Time Signal Processing", PHI.
- 4. S.K.Mitra, "Digital Signal Processing", TMH
- 5. S. Salivahanan, A Vallavaraj, "Digital Signal Processing", TMH.
- 6. Rabiner Gold, "Theory and Application of DSP", PHI.
- 7. Ifeachor, Jervis "Digital Signal Processing", Pearson.
- 8. Texas Instruments and Analog Devices DSP Chip Manuals.

		EC311- Microconti	trollers 8	k Advanced Proces	sors	
Те	aching Sche	me :	E	Exam Scheme :		
Le	ctures:	4 Hrs. / Week	F	Paper:	100 Marks	
Pra	actical:	2 Hrs. /Week	F	Practical Exam.:	50	
			T	erm Work:		
				<b>.</b>		
1	T		ics and C	Contents		Hours
T	Intel 8086	& Programming	6	numina intamunt Pris	atommet atmostra	06
	Keview of	8080, instructuon set, 8080	o prograi	inning, interrupt & i	merrupi structure	
2	8086 inter	facina				04
2	Memory in	terfacing 8255 interfacing	ng with 8	086 keyboard interf	facing stepper motor	01
	interfacing	terraeme, 0200 merraeme	15 1111 0	ooo, keybourd interi	ueing, stepper motor	
3	Advances	in microprocessor				10
	80286 Mi	croprocessor-Features,	, interna	al architecture / b	olock diagram, pin	
	descriptio	n, real address & prote	, ected vir	tual address mode	e (PVAM).	
	80386 – A	Architecture, Hardware fe	eature, re	eal mode operation	& protected Mode,	
	Segmentati	on, Virtual 8086 mode	e, Cache	e memory system,	80486 families –	
	Architectu	re memory & I/O organiza	ation, Sal	ient Features of 805	86(Pentium), System	
	architectur	e, branch prediction, Enh	hanced in	nstruction set of Pe	entium, Intel MMX,	
	Pentium pr	o and Pentium-II, Pentium	n-III			
4	8051 Micr	ocontroller				10
	Introducati	on, Evaluation Architectu	ure, Com	parison with Microp	processor, Feature of	
	MCS 51 fa	amily, 8051 Architecher, I	Pin detai	l, Addressing mode	s, I/O Ports memory	
F	Organizatio	ons, Instruction set, Program	amming			10
5	8051 Inter	tacing				10
	1/0 ports	Programming Interrup	ipts, 11	mer /Counter pi	ogramming, Serial	
	Drogrom &	ation, interfacing of LCD,	, ADC, I	JAC, Stepper motor	, key board, External	
Torm	Work	data Memory Interfacing				
The n	ractical exam	nination will be of three h	hours du	ration it will consis	t of one experiments	
specif	ied & an oral	exam based on the syllabu	us.		e of one experiments	
List o	f Experimer	nts:				
Any e	eight experir	nents from the list given	n below.4	Experiment on 80	)86 & 4	
Exper	riment on 80	)51		Ĩ		
Softw	are based					
01) A	ddition and	subtraction of two 16-bit	it numbe	rs.		
02)0	peration on	two 16-bit BCD number	rs. (Usin	g DAA instruction	.)	
(03) B	lock transfe	r of data bytes			•)	
(04) S	earching of	the smallest and largest e	element	in a block of data		
05) S	orting the el	ements of a block of data	ta in asce	anding and descend	ling order	
06) M	fultiplication	here a bit with the second sec	nher	maning and descend		
00) 1	iampileanoi		11001			

#### Hardware Based:

Any four experiments from the list given below. 1. Interfacing of ADC.

- 2. Interfacing of LCD.
- 3. Interfacing of LEDs
- 4. Interfacing of stepper motor

#### Recommended books:

- 1. The Intel Microprocessor 8086 & 80486 Pentium & Pentium pro. Architecture Programming & Interfacing. -Brey.
- 2. Advanced Microprocessor & Peripherals–A. K. Ray & K. Bhurchindi, TMH.
- 3. The 80386, 80486 & Pentium processor Hardware, software & Interfacing"- Walter Trebel, PHI Pub.
- 4. IBM PC Technical Interface manuals.
- 5. Microprocessors & Microcomputers based system design by Md. Rafiquzzaman. 1. Ajay Deshmukh, Micro controllers –TMH
- 6. M.A. Mazidi & J.G.Mazidi, The 8051 Micro controller and Embedded systems 3rd Indian reprint Pearson Education

#### **EC312- ELECTRONIC MEASUREMENTS** Teaching Scheme : Exam Scheme : Lectures: 2 Hrs. / Week Paper: 50 Marks Practical: Practical Exam.: ----Term Work: --**Topics and Contents** 1 Oscilloscope: Overview of analog CRO, Dual/ multitrace CRO, various types of probes, sampling oscilloscope, storage CRO, Digital Storage CRO, and its enhanced features such as automatic measurements, typical specification of DSO, concept of Digital Phosphor Oscilloscope (DPO), 2 Signal Analyzing Instruments: Wave analyzer, Harmonic distortion analyzer, spectrum analyzer, logic analyzer, network analyzer, FFT analyzer.

#### 3 Communication related measurements Measurement on audio/video amplifier, measurements on transmitter/ receiver; sensitivity, selectivity, non-linear distortion, fiber optic power measurement, measurement of microwave frequencies, RF/ UHF field strength meter, fiber system loss, modulation measurement, Bolometer.

#### Recommended books:

- 1. Alan S. Morris, "Principles of measurements and instrumentation", PHI.
- 2. A.D.Helfrick and W.D.Cooper, "Modern Electronic Instrumentations and Measurements Techniques", PHI.
- 3. A.J.Bowon, "Digital Communication"
- 4. H.S.Kalsi, "Electronic Instrumentation and Measurements", Tata McGraw Hill.

#### Reference Books:

- 1. Oliver Cage, "Electronic Measurement and Instrumentation", Tata McGraw Hill.
- 2. J.J. Carr, "Elements of Electronic Instrumentation and Measurements Hand book ",  $3^{rd}$  Edition Pearson Education.
- 3. Coombs, "Electronic Instrumentation Hand book".

Hours

08

04

EC313-FEEDBACK CONTROL SYSTEM				
Теа	ching Scheme :	Exam Scheme	9:	
Lect	tures: 4 Hrs. / Week	Paper:	100 Marks	
Prac	ctical: 2 Hrs. /Week	Practical:	50 Marks	
		Term Work:		
	Topics and	Contents		Hours
1	INTRODUCTION TO FEEDBACK CONTR	OL SYSTEM :		06
	Basic Components, Classification, C Examples of control system & feed Transform, Z-Transform, Differential e	)pen loop & back systems, quations	Closed loop system, overview for Laplace	
2	MODELLING A CONTROL SYSTEM:			08
	Transfer function approach –Introducti Hydraulic, pneumatic, thermal system Advantages, Error detection, proced Signal flow graph – Rules for construct SEG from a given block diagram differ	on, Definition, ms. Block Dia ure for Drawi ction of signal cential equation	Procedure for physical, gram representation – ng blocks & reduction flow graph & Drawing S	
3	ANALYSIS OF CONTROL SYSTEM	childi equation		10
5	Time response analysis- standard test Systems, steady state error & error co	signal, time re Instant, design	esponse of second order specification of second	10
	phase margin, effect of addition of pol techniques.	es and zeros o	n bode plot. Root locus	
4	Stability analysis			04
	Concept of stability condition, charac Routh-Hurwitz criterion. And Nyquis analysis: Basic concept, state vari- equations	cteristics equa st stability cri able, state m	tion, Relative stability, iterion. State Variable odel, solution of state	
5	Compensators:			06
-	Preliminary design considerations, compensations, Lag compensation, lag	needs of lead compens	compensations, lead sation	
6	CONTROL SYSTEM COMPONENTS:			06
	AC/DC Servomotors, stepper motor, as error Detector, Actuators, valves a controllers, synchronous machines concepts of Fuzzy logic, Neural based	tachometers, ind solenoid va . Programma Control system	sensors, potentiometer alves, relays, electronic ble logic controllers,	
TERM	WORK:	,		
Minim	um eight Experiment should be perform	ed the given li	st.	
LIST C	OF EXPERIMENT:			
1.	Study of control loop: temp / pressure			
2.	Determination of transfer function of g	enerator set .		
3.	Study of potentiometer as a transduce	r & error detec	tor.	
4.	Study of synchro machines .			
5.	Study of AC/DC position servo system			
6.	Study of Transients response of second	d order system		
7.	Software based expts -based on Matla	b control syste	em Toolbox, & simulink (A	۹ny
_	three)1. Bode plot 2.Root locus 3.Nyqu	uist plot 4.Tran	sient response.	
Recom	mended books:			
	Nagorn control system (11 Edition) /	atcubillo ()aata		

- 1. Modern control system. (II Edition) -Katsuhiko Ogata
- 2. Control System Engineering, I.J.Nagrath, M.Gopal (willey Eastern)
- Automatic control system. (II Edition)-Benjamin c.Kuo ,PHI
   Control Systems Engineering. S.K.Bhattacharya , Pearsons Edu
- 5. Modern Control System, Drof, Bishop, Wesly Publication

#### EC314- INDUSTRIAL DRIVES AND CONTROL (I.E.) **Teaching Scheme :** Exam Scheme : Lectures: 4 Hrs. / Week Paper: 100 Marks 2 Hrs. /Week Practical: Practical: 50 Marks Term Work: **Topics and Contents** Hours 1 DC Motor Drive : 10 Basic characteristics of DC motor, Single phase drives , single phase half wave converter drives, Single Phase full wave converter drives, single phase dual converter drives, three phase drives, three phase half wave converter drives, three phase full wave converter drives. 2 Chopper Based DC Motor Drives: 08 Introduction to choppers, first, second, four quadrant choppers, continuous & discontinuous current mode, step up & step down choppers. Control techniques for choppers- PWM, constant pulse width & variable frequency, CLC. 3 AC Motor Drives : 10 Performance characteristics, circuit for speed control, control techniques & their analysis, close loop & open loop operation. Current source inverter, drives, voltage source inverter drives. 4 Synchronous Motor Drives : 04 Types of synchronous motors- wound field cylindrical rotor motor, permanent magnet synchronous motor, operation, equivalent circuits & speed control techniques, stepper motor drives. 5 **Electrical Drives :** 04 Dynamics of electrical drives, four quadrant operation, component & classification of load torques, steady state stability. 6 Traction Drives : 04 Traction Drives circuit for main line trains, trolleys, electrical buses traction load, braking, DC traction drives with resistive control, DC traction semiconductor chopper drives, AC motor drives. **TERM WORK:** Term work will consists of record of minimum eight experiments based on above syllabi. LIST OF EXPERIMENTS : 1. Speed control of Universal Motor using SCR/TRIAC/IGBT. 2. Speed Control of DC shunt motor using three phase converter. 3. Speed Control of DC shunt motor using chopper. 4. Study of complete control system consisting of soft start circuit, speed errors amplifier current controller for DC motor. 5. Speed Control of single phase induction motor. 6. Speed Control of three phase induction motor. 7. Study of closed loop speed control of AC motor. 8. Microprocessor/ Microcontroller based speed control DC motor. 9. Study of traction for Trolley/ Train/ Bus. 10. Speed control of Stepper motor. **PRACTICAL EXAMINATION:** The practical examination will be of three hours duration. It will consists of one experiment out of the list of experiments specified & an oral examination based on the

syllabus.

#### TEXT BOOKS :

1. AC, DC Drives – B.K.Bose.

- AC,DC Drives P.C.Sen, TMH.
   Power Electronics M.H.Rashid.
- 4. First course on Electrical Drives S.K.Pillai (Wiley Eastern LFD Bombay) **REFERENCE BOOKS :**
- Electrical Drives Concepts & Applications Subrahmany, AM Vedam, TMH.
   An Introduction to Thyristors & Application –M.Ramamoorthy.

EC315- BUSINESS M	<b>1ANAGEMENT</b>
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Teaching Scheme :		Exam Scheme :		
Lectures:	2 Hrs. / Week	Paper:	50 Marks	
Practical:		Practical:		
		Term Work:		

# Topics and Contents

Hours

1	Basics concents of management - Definition - Evolution of management	05
T	thoughts - Eulertions of management	05
	Planning – Nature and purpose – Setting objectives – Management by	
	Objectives - Strategies Policies and Planning promises	
	Organizing – Nature and purpose – Departmentation – Line and Staff	
	Authority- Decentralization - Coordination	
	Controlling – Process of controlling – Control techniques	
	Decision making – Nature and nurnose – principles	
2	Knowledge Management - Key issues - KM Strategies - Architecture and	06
2	Tools – KM Practices – Concerns and Future	00
	Six Sigma – Infrastructure for Six Sigma initiatives – steps involved in	
	launching Six Sigma – identifying key areas – knowledge management and	
	Six Sigma interface	
	Mergers and Acquisitions – Take over Defenses – Methods of Payment &	
	Leverage – Regulatory control	
	World Class Manufacturing - Total Quality / Total Cost Management - Lean	
	Manufacturing Practices – Just in Time Inventory Management	
	Corporate Governance – Corporate Social Responsibility.	
3	Financial Planning and Management: Role of Financial Planning	03
	Objectives of Financial Management: Finance Manager and its	
	responsibilities.	
	Major Participants in Financial Markets	
	Ratio Analysis: Role of ratio analysis for finance.	
4	Marketing: Nature and Role of Markets and Marketing	03
	The Role of Marketing in the Firm and Society	
	Production – Selling – Marketing Orientation	
	The Marketing Concept	
	The Marketing Planning Process : Elements of a Marketing Plan	
5	Managing Global Business	03
	Nature and Trends of Globalization	
_	Marketing Aspects of Managing Global Business	
Recon	mmended Books :	
Knowl	ledge Management - Awad Elias M, Ghaziri Hassan M (Pearson Education)	
SIX S	Sigma for Every One - Eckes (John Wiley & Sons, New Jersy)	
Merge	ers Restructuring and Corporate Control – Weston, Chung, Hong (Prentice Hall)	
Corpo	I Class Manufacturing Vol. 1 and 2 (ICEAI University Press)	
Drincir	nlos and practice of Management - Sheiwalkar and Chanekar	
Frincip	tials of Management - Koontz	
Drinci	nles and practice of Management – I. M. Prasad	
Finand	cial Management- Khan and Jain	
Intern	national Business – Sundaram and Black	
ALICCIT		

EC316- Seminar

Term Work: 50

#### **Topics and Contents**

The student shall study individually some special topic beyond the scope of the syllabus under the subjects of electronics, Electronics & Telecommunication, Electronics and Communication and Industrial electronics branch from current literature, by referring the current technical journal or reference books, under the guidance of the teacher.

The student shall prepare his report together with design computation, circuit/block diagram etc, if any, and deliver talk on the topic for other students of his class in the presence of his guide and internal Examiner. The student is permitted to use audio-visual aids or any other such teaching aids.

#### Term work:

The term work for this head will consists of the report written in a technical reporting manner and presentation of the talk on the subject and will be assessed by the two internal examiners appointed by the HOD of concern Department of the institution one of whom will be his guide and the other internal teacher of the concerned branch

Prof. Prashant S. Kolhe Chairman Board of Study Dr. B. A. M. U. Aurangabad