DEPARTMENT OF TECHNOLOGY
SECOND YEAR B.TECH
Scheme of Teaching and Examination
Semester – III (Electronics & Communication Technology)

Sub code	Subject	Teaching Scheme (Hours / Week)				Examination Scheme (Marks)					
						Theory			Practical		
		L	T	P	Credit	Scheme	Max. marks	Min. Passing	Scheme	Max. marks	Min. Passing
EC211	Engineering Mathematics-III	03	---	---	03	CIE	50	20	--------	-------	--------
						SEE	50	20	--------	-------	--------
EC212	Electrical Technology	03	---	---	03	CIE	50	20	--------	-------	--------
						SEE	50	20	--------	-------	--------
EC213	Electronics Circuit Analysis & Design -I	04	---	---	04	CIE	50	20	--------	-------	--------
						SEE	50	20	--------	-------	--------
EC214	Linear Circuits	03	---	---	03	CIE	50	20	--------	-------	--------
						SEE	50	20	--------	-------	--------
EC215	Digital Techniques	04	---	---	04	CIE	50	20	--------	-------	--------
						SEE	50	20	--------	-------	---------
EC216	Programming Techniques-I	02	---	---	02	--------	-------	--------	-------	-------	-------
EC211	Engineering Mathematics-III -Tutorial	---	01	---	01	--------	--------	--------	IOE	50	20
EC212	Electrical Technology Laboratory	---	---	02	01	--------	--------	--------	EOE	50	20
EC213	Electronics Circuit Analysis & Design –I Laboratory	---	---	02	01	--------	--------	--------	EPE	50	20
EC214	Linear Circuits Tutorial	---	01	---	01	--------	--------	--------	IOE	50	20
EC215	Digital Techniques	---	---	02	01	--------	--------	--------	IPE	50	20
EC216	Programming Techniques-I Laboratory	---	---	02	01	--------	--------	--------	EPE	50	20
	Total	**19**	**02**	**08**	**25**	--------	**500**	--------	--------	**300**	--------

EC218	Environmental Studies	02	---	---	---	Project Theory	30 70	40	--------	--------	------
Audit Course-I											
	Introduction to Performing Arts	01	---	02	---	--------	-------	--------	--------	--------	------

Total Credits: 25
Total Contact Hours/Week: 29 hrs

Note: Minimum 40% marks required in SEE as passing head.

• Tutorials and practical shall be conducted in batches with batch strength not exceeding 20 students.
• Environmental Studies Theory examination will be at the IV Semester. The grading in the subject will be as per the university rules.

CIE	: Continuous Internal Evaluation	SEE	: Semester End Examination
IPE	: Internal Practical Evaluation	IOE	: Internal Oral Evaluation
EPE	: External Practical Evaluation	EOE	: External Oral Evaluation

DEPARTMENT OF TECHNOLOGY
SECOND YEAR B.TECH
Scheme of Teaching and Examination
Semester – IV (Electronics and Communication Technology)

Subject code	Subject	Teaching Scheme (Hours / Week)				Examination Scheme (Marks)					
						Theory			Practical		
		L	T	P	Credit	Scheme	Max. marks	Min. Passing	Scheme	Max. marks	Min. Passing
EC221	Electronics Circuit Analysis & Design -II	04	---	---	04	CIE	50	20	--------	-------	--------
						SEE	50	20	--------	-------	--------
EC222	Communication Technology	04	---	---	04	CIE	50	20	--------	-------	--------
						SEE	50	20	--------	-------	--------
EC223	Processor Architecture	04	---	---	04	CIE	50	20	--------	-------	--------
						SEE	50	20	--------	-------	--------
EC224	Measurement Techniques	03	---	---	03	CIE	50	20	--------	-------	--------
						SEE	50	20	--------	-------	--------
EC225	Industrial Organization and Management	02	---	---	02	CIE	50	20	--------	-------	--------
						SEE	50	20	--------	-------	---------
EC226	Programming Techniques-II	02	---	---	02	--------	-------	--------	-------	--------	-------
EC221	Electronics Circuit Analysis & Design –II Laboratory	---	---	02	01	--------	-------	--------	EPE	50	20
EC222	Communication Technology Laboratory	---	---	02	01	--------	-------	--------	EPE	50	20
EC223	Processor Architecture Laboratory	---	---	02	01	--------	-------	--------	EOE	50	20
EC224	Measurement Techniques Laboratory	---	---	02	01	--------	-------	--------	IPE	50	20
EC225	Industrial Organization and Management	---	01	---	01	--------	-------	--------	IOE	50	20
EC226	Programming Techniques-II laboratory	---	---	02	01	--------	-------	--------	IPE	50	20
	Total	**19**	**01**	**10**	**25**	--------	**500**	--------	--------	**300**	--------

EC218	Environmental Studies	02	---	---	---	Project Theory	30 70	40	--------	--------	------
Audit Course-II											

	Introduction to Foreign language	02	---	---	---	--------	-------	--------	--------	--------	------

Total Credits: 25
Total Contact Hours/Week: 30 hrs

Note:
$: Minimum 40% marks required in SEE as passing head.

• Tutorials and practical shall be conducted in batches with batch strength not exceeding 20 students.

CIE	: Continuous Internal Evaluation	SEE	: Semester End Examination
IPE	: Internal Practical Evaluation	IOE	: Internal Oral Evaluation
EPE	: External Practical Evaluation	EOE	: External Oral Evaluation

Detailed Examination Scheme

1. Out of total 100 theory marks, 50 marks are allotted for Continuous Internal Evaluation (CIE). In CIE minimum 20 marks are required to become eligible for Semester End Examination. (SEE).

2. CIE (50 marks) includes :

   - Internal Test – 1, of 25 marks in 5^{th} week on 1^{st} & 2^{nd} unit
   - Internal Test - 2, of 25 marks in 10^{th} week on 3^{rd} & 4^{th} unit

3. For the Semester End Examination (SEE), 100 marks (3 hours) paper will be set and finally it will be converted to 50 marks, in which student must secure minimum 40 % i.e. 20 marks as an university examination passing head.
4. Final theory marks (out of 100) will be the addition of CIE (out of 50 marks) and SEE (out of 50 marks).
5. Internal Practical Evaluation (IPE) will be assessed on the basis of Internal Oral/ Practical/Tutorials/seminar in which student must secure minimum 40% i.e. 20 marks.
6. Equivalence for the subjects has been mentioned at the end of syllabus.

Academic Autonomy:

1. Flexibility in deciding Structure and Contents of Curriculum with reasonable frequency for changes in the same.

2. Continuous Assessment of Students performance with newly adopted - Credit System based on Award of Grade.
3. Credits are quite simply a means of attaching relative values to courses different components. They are a currency of learning, and in general regarded as a measure of the time typically required to achieve a given curricular outcome.
4. All subjects (year-wise) under each course/discipline are unitized.

Credit system:

Education at the Institute is organized around the semester-based credit system of study. The prominent features of the credit system are a process of continuous evaluation of a student's performance/progress and flexibility to allow a student to progress at an optimum pace suited to his/her ability or convenience, subject to fulfilling minimum requirements for continuation.

A student's performance/progress is measured by the number of credits that he/she has earned, i.e. completed satisfactorily. Based on the course credits and grades obtained by the student, grade point average is calculated. A minimum grade point average is required to be maintained for satisfactory progress and continuation in the programme. Also a minimum number of earned credits and a minimum grade point average should be acquired in order to qualify for the degree. All programmes are defined by the total credit requirement and a pattern of credit distribution over courses of different categories.

Course credits assignment:

Each course, except a few special courses, has a certain number of credits assigned to it depending upon its lecture, tutorial and laboratory contact hours in a week. This weightage is also indicative of the academic expectation that includes in-class contact and self-study outside of class hours.

Lectures and Tutorials: One lecture or tutorial hour per week per semester is assigned one credit.

Practical/Laboratory: One laboratory hour per week per semester is assigned half credit.

Example: Course Electronics Circuit Analysis and Design-I : 5 Credits (04-00-02)

The credits indicated for this course are computed as follows:

Lectures: 4 hours/week = 4 credits

Tutorial: 0 hours/week = 0 credit

Practical: 2 hours/week = 2 *x* 0.5 = 1 credit

Also, (04-00-02) 5 credit course = (4 Lectures + **0** Tutorial hours + **2** Practical hours) per week = 06 contact hours per week

For each lecture or tutorial credit, the self study component is 1 hour/week. For total practical hours in a subject, the credit and therefore the self study component is half of the total hours. In the above example, the student is expected to devote 3 + 1 = 4 hours per week on self study for this course, in addition to class contact of 5 hours per week.

Earning credits:

At the end of every course, a letter grade is awarded in each course for which a student had registered. On obtaining a pass grade, the student accumulates the course credits as earned credits. A student's performance is measured by the number of credits that he/she has earned and by the weighted grade point average.

The credit system enables continuous evaluation of a student's performance, and allows the students to progress at an optimum pace suited to individual ability and convenience, subject to fulfilling minimum requirement for continuation.

Features of Credit System at Department of Technology, Shivaji University, Kolhapur:

Every subject is allotted credits based on its academic importance/weight age.

1. All subjects may not have same credits.
2. 25 Credits / Semester.
3. Absolute Grading System with 6 Passing Grades viz. AA, AB, BB, BC, CC, CD, DD and FF for failure.
4. Getting FF grades in 4 heads in the one academic year he/she considered as failed.
5. Continuous Evaluation: Internal Test 1 [25 marks], and Internal Test 2 [25 marks].
6. Standardization of courses; each course is of 6 units. T1 for unit 1 and 2, T2 for unit 3 and 4, SEE for all units.
7. Internal Test 1 & Internal Test 2 handled by internal; SEE mostly by external.
8. Under no circumstances will a request for re-test be entertained after internal test.
9. Re-examination after SEE; No examination for odd sem. courses in even sem. or vice-versa.

Attendance rule:

All students must attend every lecture, tutorial and practical class. However, to account for late registration, sickness or other such contingencies, the attendance requirement will be a minimum of 75 % of the classes actually held. A student with less than 75 % attendance in a course during the semester, in lectures, tutorials and practicals taken together (as applicable), will be awarded an 'XX' grade in that course irrespective of his/her performance in the tests.

The course coordinator will award 'XX' grade to the student who is deficient in attendance taking into account the consolidated attendance record for the whole semester. For the purpose of attendance calculation, every scheduled practical class will count as one unit irrespective of the number of contact hours.

Attendance record will be maintained based upon roll calls (or any equivalent operation) in every scheduled lecture, tutorial and practical class. The course

coordinator will maintain and consolidate attendance record for the course (lectures, tutorials and practical together, as applicable).

Evaluation system:

1. Semester Grade Point Average (SGPA) =

$$\frac{\sum (\text{course credits in passed courses X earned grade points})}{\sum (\text{Course credits in registered courses})}$$

2. Cumulative Grade Point Average (CGPA) =

$$\frac{\sum (\text{course credits in passed courses X earned grade points) of all Semesters}}{\sum (\text{Course credits in registered courses) of all Semesters}}$$

3. At the end of B. Tech Program, student will be placed in any one of the divisions as detailed below (According to AICTE Handbook):

   Ist Division with distinction: CGPA $\geq$ 8.25 and above

   Ist Division : CGPA $\geq$ 6.75 and < 8.25

   IInd Division : CGPA $\geq$ 6.75 and < 6.25

An example of these calculations is given below:

Typical academic performance calculations - I semester

Course no.	**Course credits**	**Grade awarded**	**Earned credits**	**Grade points**	**Points secured**
Col 1	Col 2	Col 3	Col 4	Col 5	Col 6 (col4 *col5)
MALXXX	5	CC	5	6	30
CSLXXX	4	CD	4	5	20
PHLXXX	4	AA	4	10	40
PHPXXX	2	BB	2	8	16
MELXXX	4	FF	0	0	00
TTNXXX	2	AB	2	9	18
Total	21		17	38	124

1. Semester Grade Point Average (SGPA) =

$$\frac{(124)}{(21)} = 5.90$$

2. Cumulative Grade Point Average (CGPA) =

   Cumulative points earned in all passed courses = 124 (past semesters) + 124 (this sem.) = 248

Cumulative earned credits = 23 (past semesters) + 21 (this sem.) = 44

$$\frac{\sum (124 + 124)}{\sum (23 + 21)} = 5.63$$

System of Evaluation

Grade	Grade Points	Range	Description of Performance
AA	10	91-100	Outstanding
AB	09	86-90	Excellent
BB	08	76-85	Very Good
BC	07	66-75	Good
CC	06	56-65	Fair
CD	05	46-55	Average
DD	04	40-45	Poor
FF	00	Below 40	Fail (Eligible for Re-exam)
XX	--	--	Insufficient attendance
AB	--	--	Absent
$	--	--	Passed in Ist attempt

Audit Courses:

Additional courses shall be included as audit courses from the third semester onwards. While the performance of the student in audited courses shall be included in the Grade Card. These grades are not contributed to SGPA or CGPA of the concerned student.

ENGINEERING MATHEMATICS-III (MA211)

Teaching scheme	**Examination scheme**
Lectures: 3 hrs / week	**Theory: CIE (50) + SEE (50) = 100 Marks**
Tutorials: 1 hr / week	**IOE: 50 marks**

UNIT-I Linear Differential Equations (6 Hrs)

Linear Differential Equations with constant coefficients, Homogenous Linear differential equations, method of variation of parameters, Applications of LDE with constant coefficients to Electrical systems.

UNIT-II Partial Differential Equation (5 Hrs)

Four standard forms of partial differential equation of first order.

UNIT–III Laplace Transform (7 Hrs)

Definition, properties of Laplace transforms, transforms of derivatives, transforms of integral, Inverse Laplace transforms, Convolution theorem. Applications to initial value boundary problems, Heaviside Unit step function, Diracdelta function, Periodic function.

UNIT-IV Fourier and Z Transform (7 Hrs)

Fourier transforms, Fourier sine and cosine transforms, complex form of Fourier integral, Finite Fourier sine and cosine transforms. Z Transform: Definition, properties of z transform, Z Transform of basic sequences, Z transform of some standard discrete function, inverse Z transform.

UNIT- V Probability (5 Hrs)

Definitions of Random variable, Discrete and continuous random variable, Expected value of random variable, Variance, Moments and moment generating functions. Probability mass function and probability density function, Probability distribution for random variables , Binomial, Poisson and Normal distributions

UNIT -VI Vector Differentiation (6 Hrs)

Differentiation of vectors, Gradient of scalar point function, Directional derivative, Divergence of vector point function, Curl of a vector point function. Irrotational and solenoidal vector field.

REFERENCE BOOKS:

1. J. N. Wartikar & P. N.Wartikar , "A text book of Applied Mathematics: Vol. I, II and III" Vidyarthi Griha Prakashan, Pune.

2. Dr. B. S. Grewal. "Higher Engineering Mathematics"

3. Erwin Kreyszig. "Advanced Engineering Mathematics"

4. N. P. Bali, Ashok Saxena and N. Ch. S. N.Iyengar " A textbook of Engineering Mathematics"Laxmi Publication, Delhi.

ELECTRICAL TECHNOLOGY (ETC 211)

Teaching scheme **Examination scheme**

Lectures : 3 hrs / week **Theory: CIE (50) + SEE (50)= 100 Marks**

Practicals: 2 hrs / week **EOE: 50 marks**

UNIT.1 DC and AC Motor starters, Speed Control and breaking methods (6 Hrs)

DC Motor – speed control and Electrical Breaking methods for shunt and series motor, Necessity of starters, three point , Four point and Electronic starter for DC motor. AC Motor—Squirrel cage motor starter (DOL Starter, Auto transformer and star delta starter), Speed control methods of Induction motor.

UNIT.2 Poly Phase Circuits (6 Hrs)

Generation of polyphase voltages , Relationship between line & phase values for star & delta connections.Active, Reactive and Power factor measurement in three phase balanced circuits by two wattmeter metods. (Numerical treatment).

UNIT.3 Three Phase Transformers and Induction Motors (12 Hrs)

Construction , type of connection – Star-Star , Star- Delta, Delta- Star, Delta-Delta, V-V & T-T
connections, selection criterion of single phase & 3 phase transformers.

Classification of AC motors ,Induction Motor –Working principle, construction(Squirrel cage and Phase wound rotor), slip frequency of rotor current, relation between torque and rotor power factor , starting torque , condition for maximum starting torque, full load torque and maximum torque, starting torque and maximum torque, torque slip characteristics, induction motor as generalized transformer (Numerical treatment).

UNIT.4 Power factor Measurement and correction (6 Hrs)

Significance of power factor, Causes of low power factor, Disadvantages of low power factor, power factor correction methods (Numerical treatment).

UNIT.5 Special purpose Machines (12 Hrs)

Construction, working Principle, types and applications -Reluctance motor, AC/DC Tachogenerators, single phase induction , servo and stepper motors.

UNIT.6 Electrical devices and Instruments (6 Hrs)

Types of contactors, Electromagnetic relays, Circuit breakers-Miniature circuit breaker, Earth leakage circuit breaker, Isolator, Types of cables (HT, LT Cables).

TEXT BOOKS

1) B. L Theraja- Electrical Techonology Ist and IInd volm.

2) S.L. Uppal – Electrical power XIth Edition

REFERENCE BOOKS

1) H. Prathab –Utilisation of Electrical Energy

2) H.Cotton - Electrical Techonology VII th Edition

3) I J Nagarath and M Gopal—Control System Engg.

4) D. P. Kothari, I J Nagarath – Electrical Machine IIIrd Edition

LIST OF EXPERIMENTS (MIN. 8)

1) Study of Break load test on DC motor

2) Study of load test on three phase Induction motor

3) Active and reactive power measurement by using two wattmeter method

4) Study of three phase transformer connections

5) Speed torque characteristics of AC servo motor

6) Power factor measurement of series RLC circuit.

7) Study of various starters

8) Study of synchros

9) Insulation resistance measurement of cables using Megger.

ELECTRONIC CIRCUIT ANALYSIS AND DESIGN – I (ETC 212)

Teaching scheme **Examination scheme**

Lectures: 4 hrs / week **Theory: CIE (50) + SEE (50)= 100 Marks**

Practical: 2 hrs / week **EPE: 50 marks**

UNIT.1. Unregulated power supplies (8 Hrs)

Review of rectifiers, analysis of different parameters ,PIV, TUF, efficiency, ripple factor, regulation, etc. specifications and ratings of diodes. Filters – types of filters, analysis for ripple factor and regulation. Design of unregulated power supplies with and without filters,

Different types of filters and their design

UNIT.2. Voltage Regulators (7 Hrs)

Need of voltage regulator, Stabilization factors, Analysis & Design of Shunt regulator (using Zener diode & BJT), series voltage regulator (using BJT) Series voltage regulator with Pre-regulator & Overload protection circuit.

UNIT.3. Transistor Biasing (8 Hrs)

Need of biasing, DC load line analysis, operating point, thermal runaway. Different biasing circuits: fixed bias, collector to base bias & voltage divider bias. Stability factor, General expression for stability factor, stability factor for all biasing circuits. Design of biasing circuits, Compensation techniques:Thermistor and diode compensation.

UNIT.4. Voltage Amplifier (8 Hrs)

H-Parameters, Hybrid model for transistor (CE, CB& CC configuration), Generalized H-parameter analysis of transistor amplifier for Voltage Gain, Current gain, Input resistance & Output resistance taking Rs into account, approximate H-parameter model for CE,CB & CC. Classification of voltage amplifiers, Detailed study of Single stage RC coupled amplifier & Emitter follower. Analysis for voltage gain, current gain, input resistance & Output resistance. Design of single stage RC coupled amplifier & Emitter follower. Frequency response of single stage RC coupled amplifier

UNIT.5. Frequency response of single stage RC coupled amplifier (8 Hrs)

Low frequency response Effect of emitter bypass capacitor(CE) & Coupling capacitor(Cc), Amplifier response to square wave, percentage Sag calculation, High frequency response: Hybrid p model , Derivation for CE short circuit & resistive current gain, ß cutoff, _ cutoff

frequency, approximate amplifier high freq. response to square wave, gain bandwidth product

UNIT.6. Feedback Amplifiers (6 Hrs)

General theory of feedback, reasons for negative feedback. Types of negative feedback in transistor circuits: Voltage series, Current series,Voltage shunt, Current shunt feedback amplifiers, Darlington pair, Darlington amplifier using bootstrapping principle. Design of Voltage series feedback amplifier

TEXT BOOKS:

1. Allen Mottershed –'Electronic devices & circuits'-Prentice- Hall India

2. J. Millman & C.Halkias -'Electronic devices & circuits'-2nd Edition- Tata

McGraw Hill Publication

3. N.C. Goyal & R.K. Khetan-' A Monograph on Electronics Design Principles'-5th

Edition- Khanna Publishers

REFERENCES BOOKS:

1. David A. Bell –'Electronic devices & circuits'- 4th Edition- Prentice- Hall India

2. Robert L. Boylsted, Louis Nashelsky- 'Electronic devices & circuit theory'- 9th

edition- Pearson Education

3. National Semiconductor Data Manual.

LIST OF EXPERIMENTS (MINIMUM 8)

1. Study of ratings of Electronic components and lab. Equipments.

2. Design & analysis of Half wave rectifier(HWR) with & without filter by

calculating performance parameters

3. Design & analysis of Full wave rectifier(FWR) with & without filter by

calculating performance parameters

4. Design & analysis of Bridge rectifier with & without filter by calculating

performance parameters

5. Design & analysis of Zener shunt regulator.

6. Design & analysis of Transistorized shunt regulator.

7. Design & analysis of series pass regulator with & without pre- regulator.

8. Design & analysis of Voltage divider biasing circuit.

9. Determination of H-parameters from transistor CE characteristics.

10. Calculation of performance parameters (Av, Ai, Ri, Ro) for single stage RC

coupled amplifier.

11. Study of Frequency response of single stage stage RC coupled amplifier.

12. Study of square wave response of RC coupled amplifier & calculation of Sag & rise time (tr).

13. Comparative study of voltage amplifiers (with & without feedback).

14. Design & analysis of voltage series feedback amplifier.

Note for paper setter:

• Question paper shall consist of approximately 75% analysis & design based problems

and approximately 25% theory should be covered.

LINEAR CIRCUITS (ETC213)

Teaching scheme	**Examination scheme**
Lectures: 3 hrs / week	**Theory: CIE (50) + SEE (50)= 100 Marks**
Tutorial: 1 hr/week	**IOE: 50 marks**

UNIT.1. Circuit fundamentals (9 Hrs)

Voltage sources, Current sources, Conversion of voltage sources to current sources and vice a versa. Network terminology :- Node ,Junction, Branch, Loop, Network solution by branch current method, Loop or Mesh current method, Node voltage method, Star delta

connection and conversion Network Theorems:-Thenenins Theorem, Nortans Thereon , Maximum Power Transfer Theorem, Superposition Theorem, Millmans theorem, Substitution theorem.

UNIT.2. Resonance Circuits (10 Hrs)

Series resonance circuit, Frequency response of a series resonant circuit, Q factor, Bandwidth, selectivity, Effect of Q on bandwidth and selectivity,Relation between bandwidth and Q, Impedance of a series resonant circuit, Resonance by variation of L and C, Parallel resonant circuit and effect of resistance of a capacitance, Frequency response of parallel resonant circuit.

UNIT.3. Two- port Network (9 Hrs)

Two- port network parameters, r, y, z, h, A B C D relation between the parameters, Inter-conversion of two port networks, cascade connection series connection, series parallel connection, T and M network representation of a two port network.

UNIT.4. Network functions (10 Hrs)

Laplace transform, Transform of a voltage and current, Transform of circuit elements, Network functions, Poles and zeros of the network functions, Pole zero plot, Physical significance of poles and zeroes, Stability, Two-port network parameters in the frequency domain Transient response: - step input response in R-L circuit, step input response in

R-C circuit, step input response in R-L-C circuit, ac transients.

UNIT.5. Filters (05 Hrs)

Definitions, classification and characteristics of different filters, filter fundamentals such as attenuation constant(alpha), phase shift (beta), propagation constant (gamma), characteristic impedance (Zo), decibel, neper.Design and analysis of constant K, M derived and composite filters (low pass, high pass, band pass, and band stop filters): T and PI sections.

UNIT.6. Attenuators (05 Hrs)

definitions, classification, relation between neper and decibel, analysis and design of T type, PI type, alpha lattice, bridged –T and L types attenuators.

REFERENCE BOOKS:-

1. A.Sudhakar, Shymmohan S. Palli, 'Circuit and Netsork – Analysis and Synthesis', IIIrd Edition, Tata McGraw Hill Publication.

2. D. Roy Choudhuri, 'Networks and Systems', New Age International Publisher.

3. A. Chakrabarti, 'Circuit theory (Analysis and Synthesis)', IIIrd edition, Dhanpat Rai and Co.

4. M.E.Van Valkenburg, 'Network Analysis', IIIrd edition, Pearsons Education/PHI.

5. Josheph Edministrar, 'Theory and Problems of Electronic Circuit (Schaum's Series) – Tata McGraw Hill Publication.

6. Soni Gupta, 'Electrical Circuit Analysis', Dhanpat Rai and Co.

7. Boylestad, 'Introductory Circuit Analysis', Universal Book Stall, New Delhi.

DIGITAL TECHNIQUES (ETC214)

Teaching scheme	**Examination scheme**
Lectures: 4 hrs / week	**Theory: CIE (50) + SEE (50)= 100 Marks**
Practical: 2 hrs/week	**IPE: 50 marks**

UNIT.1. Binary Arithmetic & Codes (6 Hrs)

Binary arithmetic operations: addition, Subtraction,multiplication, Division of binary numbers, Subtraction using 2's complement method.Binary codes: weighted and non weighted codes, self complementary codes, BCD,Excesses-3, Gray codes, error detecting and correcting codes, hamming codes,alphanumeric codes, ASCII Codes.

UNIT.2. Boolean Algebra and Boolean Function Reduction Techniques (9 Hrs)

Boolean Laws and Expression using Logic Gates, Realization of different gates using Universal gates, De-Morgan's Theorem, Duality Theorems. Standard forms: SOP, POS, Simplification of Switching function & representation (Maxterm & Minterm), Boolean expression & representation using logic gates, Propagation delay in logic gate. Karnaugh map: K-map Format up to 4 variables, mapping and minimization of SOP and POS expression, Don't care condition, conversion from SOP to POS and POS to SOP form using K-map, minimization of

multiple output circuits,Quine: Mc-cluskey method (up to 4-variable) - minimization technique, prime implicant table, Don't care condition.

UNIT.3. Combinational Circuits Desigital (10 Hrs)

Adder & Subtractor(Half and Full), Parallel Binary adder, BCD Adder, Binary multipliers, Code Converters, parity bit generator, Comparators, , Decoder, BCD to 7-segment Decoder ,Encoders, Priority encoders, Multiplexers, De Multiplexers.

UNIT.4. Sequential Circuits Elements (10 Hrs)

Flip-flop & Timing Circuits: SR latch, Gated latch, Edge triggered flip-plop:- D, JK, T Flip-flop, flipflop asynchronous inputs ,characteristic table of Flip-flop, excitation table of Flip-flop, , master slave JK flip flop, inter conversion of Flip-flop. Study of timing parameters of flip-flop: clock to Q, setup time, hold time, timing parameters of flipflop asynchronous input

UNIT.5. Shift Registers and Counters (10 Hrs)

Shit resistor: buffer register, controlled buffer register. Data transmission in shift resistor SISO, SIPO, PISO, PIPO, Bidirectional shift resistor universal shift resistor. Counter: Classification, Ripple or asynchronous counter, Effect of propagation delay in ripple counters, up-down counter, Mod-n counter, synchronous counter, Ring counter, Johnson counter.

UNIT.6. Logic Families (4 Hrs)

Digital IC specification terminology, Logic families: TTL, CMOS, ECL families, Interfacing of TTL to CMOS & CMOS to TTL.

TEXT BOOKS:

1. A. Anand Kumar 'Fundamentals of Digital Circuits'--. PHI

2. M. Morris Mano 'Digital Design'-- (Third Edition),. PHI

REFERENCE BOOKS:

1. Willim I. Fletcher.'An Engineering Approach to Digital Design'—PHI/ Pearson

2. Norman Balabanian Bradle Carlson. 'Digital Logic Design Principals,.' Wiley Publication.

3. Rajkamal 'Digital Systems Principals and Design'—Pearson

4. A.P. Malvino, D.P. Leach 'Digital Principles & Applicatios' -VIth Edition-TMH publication.

5 R.P. Jain-'Modern Digital Electronics' IIIrd Edition- Tata Mc Graw Hill, Publication.

LIST OF PRACTICALS:

1. Study of basic gates using TTL, CMOS: 7432, 4011, 4050, 4070,4071,40106
2. Study of Static I/O and transfer Characteristic of TTL.
3. Study of Static I/O and transfer Characteristic of CMOS.
4. Study of Universal gates (NAND, NOR)
5. K map based implementation of combinational logic
6. Half and Full Adder, Half and Full Subtractor
7. 4 bit parallel Adder / Subtractor using IC 7483
8. Code Converters (Binary to Gray, Excess 3 to Binary)
9. Comparator using IC 7485
10. Implementation of combinational logic using MUX
11. Study of Decoder and DEMUX (IC 74138)
12. Study of 7 segment decoder driver. (IC 7447)
13. Study of Flip Flops (SR FF, D FF, JK FF, T FF)
14. Design Built and test MOD N counter
15. Design Built and test Shift Register
16. Design and implementation of Johnson Counter
17. Design 3 bit sequence detector

PROGRAMMING TECHNIQUES – I (ETC215)

Teaching scheme **Examination scheme**

Lectures: 2 hrs / week

Practical: 2 hr / week **EPE: 50 marks**

UNIT.1. Introduction (5 Hrs)

Object oriented programming [C++], applications of OOP & C++,dynamic initialization of variables, storage classes. Functions in C++, function prototype,call & return by reference, inline function, Default & Const argument.

UNIT.2. Classes & Objects (6 Hrs)

Specifying class, defining member function, making an outside function inline, Nesting member function, private member function, Arrays within a class, memory allocation for objects, Array of objects, pointer to members.

UNIT.3. Constructors and Destructors (6 Hrs)

Constructors, parameterized and multiple, Constructors with default arguments, Dynamic initialization of objects (new, delete) copy constructor, dynamic constructors and destructors.

UNIT.4. Polymorphism & Inheritance (6 Hrs)

Function overloading, Unary & binary operator overloading, manipulation of strings using operators. Friend function & friend class. Single, multiple, multilevel, Hybrid, Hierarchical inheritance, virtual base classes, Abstract classes.

UNIT.5. Pointers (5 Hrs)

Pointers to objects, this pointer, pointer to derived classes

UNIT.6. File Handling (5 Hrs)

Classes for file stream operations, opening and closing of files, file modes, file pointer & their manipulations, sequential I/O operations. Graphics: Introduction to graphics.

TEXT BOOK:

1. E Balgurusamy –'Object oriented programming with C++' -, IInd Edition- Tata Mc-

Graw Hill Publication

REFERENCE BOOK:

1. Herbert Schildt –'The Complete Reference C++' - IIIrd Edition - Tata McGraw Hill

Publication

2. Ravichandran D.-'Programming with C++ '-IInd Edition- Tata McGraw Hill

Publication

3. Robert Lafore –'C++ Programming' –. IV th Edition –Techmedia, New Delhi.

TERM WORK (Minimum 8 programs based on)

1. Classes & objects - 1

2. Constructors &Destructors - 1

3. Copy Constructor - 1

4. Unary operator overloading - 1

5. Binary operator overloading - 1

6. Function overloading - 1

7. Friend function - 1

8. Friend class - 1

9. Inheritance - 2

10. Pointers and virtual function - 1

11. File handling - 1

12. Graphics. – 1

Semester IV

ELECTRONIC CIRCUIT ANALYSIS AND DESIGN – II (ETC 221)

Teaching scheme **Examination scheme**

Lectures: 4 hrs / week **Theory: CIE (50) + SEE (50)= 100 Marks**

Practical: 2 hr / week **EPE: 50 marks**

UNIT.1. IC regulators (7 Hrs)

Study and design of regulators using IC's:78XX, 79XX, 723, LM317, Switching regulator: Introduction, study of LM3524.

UNIT.2. Wave Shaping Circuits (7 Hrs)

Low pass & high pass RC circuits (square & step response), High pass RC circuit as a differentiator, Low pass RC circuit as integrator.Clipping circuits: Classification, diode clippers transistor clippers, Transfer characteristics, Design & analysis of clipper circuits. Clamping circuits: Classification, clamping operations, Clamping circuit theorem, practical clamping circuits.Voltage multipliers: Doubbler, Trippler & Qudrappler circuits.

UNIT.3. Multi Stage Amplifier (7 Hrs)

Need of cascading, Parameter evaluation such as Ri , Ro, Av,Ai & Bandwidth for general multi stage amplifier ,Analysis & design at low frequency & mid frequency of RC coupled, direct coupled & voltage series feed back (Two stage)amplifier.

UNIT.4. Power Amplifiers (9 Hrs)

Need of Power amplifier, classification of power amplifier, Power considerations, Distortion in power amplifiers: Phase, Frequency, amplitude/ harmonic /non linear distortion, amplitude distortion using Three point method. Class A single ended transformer coupled amplifier& class A Push pull amplifiers analysis and design, Class B amplifier & class B push pull amplifier analysis & design, crossover distortion, class AB Push pull amplifiers analysis and design Complementary symmetry power amplifier.

UNIT.5. FET & MOSFET (7Hrs)

Biasing of JFET, Common source FET amplifier at low and high frequency- analysis and design. MOSFET-construction, characteristics and comparative study of Enhancement and Depletion MOSFET (P-channel & N-channel), Handling precautions of MOS devices, ratings and specifications of MOS, CMOS inverter.

UNIT.6. Oscillators and Multivibrators (14 Hrs)

Oscillators: Barkhausen's criteria , Frequency and amplitude stability, Classification, RC oscillators , RC phase shift & Wein bridge oscillator analysis & design using BJT & FET , LC

oscillators, Colpit's & Hartely's oscillators analysis and design using BJT,Crystal oscillator. **Multivibrators:**Transistor as a switch, Different transistor switching parameters,classification of multivibrators, Analysis and design of Astable, Monostable, Bistable multivibrator and Schmitt trigger using BJT. Design of triggering circuits for Multivibrators

TEXT BOOKS:

1. J. Millman & C.Halkias -'Electronic devices & circuits'-II Edition- Tata McGraw Hill Publication

2. Allen Mottershed –'Electronic devices & circuits'-Prentice- Hall India

3. N.C. Goyal & R.K. Khetan-' A Monograph on Electronics Design Principles'-V

Edition- Khanna Publishers

4. J. Milman & H. Taub ' Pulse Digital & Switching Waveforms' - IInd Edition- Tata

McGraw Hill Publication

REFERENCES BOOKS:

1. David A. Bell –'Electronic devices & circuits'- IV Edition- Prentice- Hall India

2. J Millman & A. Grabel-' Microelectronics'- II Edition- McGraw Hill International

Editions

3. National Semiconductor Data Manual.

4. M.S. Roden, G.L. Carpenter ' Electronic Design- From Concept to reality'-IV Edition-

Shroff publisher & Distributors

LIST OF EXPERIMENTS (minimum 08)

1. Study of RC low pass filter as an integrator

b. Study of frequency response of low pass filter

2. Study of RC high pass filter as a differentiator

b. Study of frequency response of high pass filter

3. Design of different clipper circuits

4. Study of different clamper circuits: positive, negative & bias

5. Design & study of Frequency response of two stage RC coupled amplifiers

6. Study of power amplifiers

7. Design of astable multivibrators

8. Design of monostable multivibrators

9. Design of bistable multivibrators

10. Design of Schmitt trigger

11. Design of Wein bridge oscillator using BJT.

12. Design of RC phase shift oscillators using BJT/ FET.

13. Design of Collpitt's oscillators using BJT

14. Design of Hartly oscillators using BJT

15. Study of Frequency response of Common Source (CS) amplifier

Note for paper setter:

• Question paper shall consist of approximately 75% analysis & design based problems

and approximately 25 % theory should be covered.

COMMUNICATION TECHNOLOGY (ETC 222)

Teaching scheme	**Examination scheme**
Lectures: 4 hrs / week	**Theory: CIE (50) + SEE (50)= 100 Marks**
Practicals: 2 hrs / week	**EPE: 50 marks**

UNIT.1. Introduction **(7 Hrs)**

Block schematic of communication system, base band signals, RF bands, Necessity of modulation, types of modulation – AM, FM, PM and Pulse Modulation. Noise types, Noise figure. Introduction to radio wave propagation, ground wave, space wave and sky wave.

UNIT.2. Amplitude Modulation **(7 Hrs)**

Amplitude Modulation principles, AM envelope, frequency spectrum & BW, phase representation of AM wave, Modulation index, % modulation (Numericals expected) AM modulating circuits: Low level AM modulation, medium power AM modulation, AM transmitters: Block of low level DSBFC, High level DSBFC, Trapezoidal patterns Evolution and

descriptions of SSB, Suppression of carrier using balanced modulator, Suppression of unwanted sideband, Methods: Filter system, phase shift & third method Vestigial sideband(VSB)

UNIT.3. Angle Modulation (7 Hrs)

Theory of frequency and phase modulation, mathematical analysis, deviation sensitivity, FM and PM waveforms, phase deviation and modulation index, frequency deviation and percentage modulation, angle modulation circuits using varactor diode ,using frequency analysis of angle modulated wave-Bessel function, BW requirements, deviation ratio, Noise and angle modulation, pre-emphasis and deemphasis.

UNIT.4. Pulse Modulation (7 Hrs)

Pulse amplitude modulation, Sampling theorem & type:Natural & flat top, PAM modulation circuit, PAM demodulation circuit, TDM and FDM, Crosstalk in TDM, pulse time modulation, generation of PTM signals (direct-indirect method),PWM modulator, PPM modulators, demodulation of PTM

UNIT.5. AM and FM Receivers (14 Hrs)

Simplified block diagram of AM receiver, receiver parameters:Sensitivity, Selectivity, BW, dynamic range, Tracking, fidelity, Types of AM receiver:TRF and superhetrodyne (block diagram), AM detection types: using diode, practical diode detector, distortion in diode detector. Negative peak clipping & diagonal clipping, Demodulation of SSB using: product demodulator & diode balanced modulator, Automatic Gain Control (AGC). **FM Receiver:**
Double conversion FM receivers, block diagram, FM demodulator, tuned circuit frequency discriminators, slope detectors, fosters seeley discriminator, ratio detectors, PLL-FM demodulators, FM noise suppression , Antenna: basic consideration radiation, Radiation mechanism, Elementary doublet.

UNIT.6. Antennas (7 Hrs)

Introduction, Basic Antenna operation, Antenna reciprocity, Antenna coordinate system & radiation patterns , Antenna gain ,captured power density, Antenna captured area & power, Antenna polarization , beam width , BW, input impedance , Basic antenna: Half wave dipole ,folded dipole, yaggi-uda antenna .

TEXT BOOKS:

1. George Kennedy ‘Electronics Communication System’- 4th Edition-Tata McGraw Hill

Publication.

2. Wayne Tomasi ‘Electronics Communication System’ -Fundamentals through

Advanced.- 5th Edition- Pearson Education.

REFERENCE BOOKS:

1. R P Singh, S D Sapre 'Communication System-Analog & Digital' 2nd Edition –Tata Mc Graw Hill Publication

2. Dennis Roddy, John Coolen.'Electronics Communications '4th Edition-Pearson Education

LIST OF EXPERIMENTS (minimum 10):

1. Study of Amplitude Modulation (A.M.)
2. Study of AM Detection.
3. Study of AM Receiver Characteristics.(Sensitivity, Selectivity & Fidelity)
4. Study of Frequency Modulation.(F.M.)
5. Study of FM Demodulation.
6. Sampling and Reconstruction.
7. Study of Pulse Amplitude Modulation (PAM.)
8. Study of Pulse Width Modulation.(PWM)
9. Study of Pulse Position Modulation.(PPM)
10. Study of PAM-TDM.
11. Study of Antenna Parameters.
12. Study of SSB Modulation & Demodulation.
13. Study of DSB Modulation & Demodulation.
14. Visit to AIR (AM/FM).

Note: Visit to AIR station is compulsory. Student should attach report of visit to journal.

PROCESSOR ARCHITECTURES (ETC223)

Teaching scheme	**Examination scheme**
Lectures: 4 hrs / week	**Theory: CIE (50) + SEE (50)= 100 Marks**
Practical 2 hrs/week	**EOE: 50 marks**

UNIT.1. Processor Organization **(8 Hrs)**

CPU, other resources, buses, introduction to Von-Neumann and Harward Architectures, comparison of Von-Neumann and Harward approaches, introduction to pipelines. Types of memories

UNIT.2. Architecture (8 Hrs)

Basics of microprocessors, pin description, architecture of Intel 8085 microprocessor, bus organization, memory interface, clock, I/O devices, synchronization and interfacing, WAIT, HOLD, HALT states, types of interfaces – handshake, polling, DMA, Stack and Subroutines.

UNIT.3. Instruction set (8 Hrs)

Classification of Instruction, Addressing modes, Instruction format, Instruction set, Assembly language programming, timing diagrams.

UNIT.4.Interrupts (8 Hrs)

Types of interrupts, Interrupt structure of Intel 8085, hardware and software interrupts, ISR, Vectored and non-vectored interrupt, vector address, interrupt driven I/O.

UNIT.5. I/O interfacing (8 Hrs)

Concept of I/O ports, memory mapped I/O and I/O mapped I/O schemes, I/O instructions, data transfer techniques, interrupt driven I/O.

UNIT.6. Interfacing devices and chips (8 Hrs)

Interfacing chips PPI 8255, 8279 Keyboard and Display interface, 8253/8254, 8251. Interfacing of keyboard, seven segment displays, relay, stepper motor, thumb wheel switches.

REFERENCE:

1. The 8085 microprocessor – Ramesh Gaonkar

2. The Intel Microprocessors: Barry B. Brey, Prentice Hall of India Ltd. (1997)

3. Microprocessors and Microcomputer Based Systems: M. Rafiqzzuman, Universal

Book Stall (1990)

4. Digital Techniques and Interfacing, D.V.Hall, Pearson education.

List of the Experiments.

Software based:

Any ten experiments from the list given below.

01) Addition and subtraction of two 8-bit numbers with programs based on different Addressing modes of 8085A.

02) Addition and subtraction of two 16-bit numbers. (Using 2's complement method, also programs which access numbers from specified memory locations.)

03) Addition and subtraction of two 16-bit BCD numbers. (using DAA instruction.)

04) Multiplication of two 8-bit numbers using the method of successive addition and Shift & add.

05) Division of two 8-bit numbers using the method of successive subtraction and shift & subtract.

06) Block transfer and block exchange of data bytes.

07) Finding the smallest and largest element in a block of data.

08) Arranging the elements of a block of data in ascending and descending order.

09) Converting 2 digit numbers to their equivalents.

a) BCD to HEX and b) HEX to BCD

10) Generating delays of different time intervals using delay subroutines and Measurement of delay period on CRO using SOD pin of 8085A.

11) Generation of Fibonacci Series.

12) A) Digit separation of a 16 bit number (i.e. the given number is ABCD H, then separate it as 0D H, 0C H, OB H, OA H and store in consecutive memory location.)

B) Addition of these separated digits and storing sum at next consecutive memory Location. (0A+0B+0C+OD = 2E H)

C) Reversing the upper byte and lower byte of given numbers. (i.e. if given number is ABCD H then revered should be BA H upper byte and DC H in lower byte).

13) A) 16 bit sum of string of data.

B) Reversing a string of data.

14) Generation of Prime Nos.

Some of the above experiments may be performed using 8085 simulators.

Hardware Based:-

Any six experiments from the list given below.

01) Program controlled data transfer using 8255 PPI.

A) To INPUT data bytes from peripheral port and to store them in memory.

B) To OUTPUT data bytes from memory to peripheral port.

02) Study of interrupts by enabling them in main line program and then executing different subroutines when TRAP, RST 7.5, RST 6.5 & RST 5.5 are activated.

03) Interfacing 7 segment LED display using 8255A – in static and dynamic mode.

04) Interfacing keyboard-using 8279.

05) Interfacing display-using 8279.

06) Interfacing ADC 0808/0809.

07) Interfacing DAC 0808.

08) Interfacing stepper motor with microprocessor using 8255A – in Half and Full excitation.

09) Interfacing of thumbwheel switches.

10) Interfacing of 8253 / 8254.

11) Interfacing of 8251.

ETC224 MEASUREMENT TECHNIQUES

Teaching scheme	**Examination scheme**
Lectures: 3 hrs / week	**Theory: CIE (50) + SEE (50)= 100 Marks**
Practicals: 2 hrs / week	**IPE: 50 marks**

UNIT.1. Introduction to Measurements Systems and Measuring Instruments (8 Hrs)

Measurements, significance of measurements, methods of measurements-Direct & indirect method, elements of generalized measurement system, measurement system performance, Performance characteristics- static and dynamic characteristic, Errors- Types & source of error. Digital voltmeters- Introduction, Dual Slope Integrating type DVM, Integrating type DVM & successive approximation principles, general specifications of DVM, digital multimeter, clamp meter, digital measurements of time, digital frequency meter, stroboscope, Q meter, phase measurement.

UNIT.2. Transducers (8 Hrs)

Definition, classification, transducer selection, different types of transducers, strain gauges, RTD, thermistor, thermocouple, semiconductor diode temperature sensor, LVDT, capacitive transducers, piezoelectric transducer, photovoltaic cell, LDR, Elastic pressure transducer – bellows, bourdon tubes, diaphragm, speed measurement using magnetic and photoelectric pickup, ultrasonic transducers – level measurement, vibrations transducers – piezoelectric transducers

UNIT.3. AC and DC Bridges (8 Hrs)

DC bridges: Introduction, wheatstone's bridge, Kelvin bridge, guarded Wheatstone bridge, AC bridges: Condition for bridge balance .Maxwell bridge, Hay bridge, Schering bridge, wein bridge, Wagner ground connection (Numericals are expected), Bolometer & RF power measurement.

UNIT.4. Oscillosope & Display Devices (8 Hrs)

Preview of CRO, Basic principle, CRT, horizontal and vertical deflection system (analytical treatment expected), delay line & types, Types of CRO: Dual Bean, Dual Trace, sampling, Digital storage, digital readout, measurement of phase and frequency using Lissajous pattern, CRO probes: active, passive, current, attenuators: uncompensated & compensated type Display devices: Digital display system, classification of display, display devices & principle: LED,LCD,Dot matrix printer.

UNIT.5. Signal Generators and Analyzers (8 Hrs)

Signal generators: Function generators, Sweep,pulse and square wave generator. Wave Analyzers: Introduction, basic wave analyzer, heterodyne harmonic distortion analyzer, spectrum analyzer, Digital Fourier analyzer, logic analyzer, Wobbluscope.

UNIT.6. Data Acquisition System and Conversion (8 Hrs)

Introduction ,Objective of DAS, Signal Conditioning of inputs ,Single channel & Multichannel DAS data conversion, Sample and hold, digital transducers. DAC concepts: Binary weighted DAC, R-2R ladder circuit DAC ADC concept: flash, single slope, dual slope, stair case Ramp ADC, successive approximation ADC, Data Loggers.

TEXT BOOKS

1. H .S. Kalsi 'Elecronic Instrumentation' – 2nd edition --Tata McGraw Hill Publication

2. A. D. Helfrick , W. D. Cooper ' Modern Electronic Instrumentation and Measurement Techniques'-- Pearson Education

REFERENCE BOOK:

1. A.K.Sawhney 'A Course in Electrical & Electronics Measurement & Instrumentation.' –11th Edition, 1996 --Dhanpat Rai & sons

2. C.S. Rangan ,G.R. Sharma , V.S.V. Mani 'Instrumentation devices and system'— 2nd edition --Tata McGraw Hill Publication

3. B.C.Nakra, K.K.Choudhary 'Instrumentation, Measurement and Analysis', 2nd edition -- Tata McGraw Hill Publication

4. E.O.Doebeline.'Measurement systems application and design 'Tata McGraw Hill Publication

5. Oliver Cage 'Electronic measurement and instrumentation 'Tata McGraw Hill Publication

LIST OF EXPERIMENTS (minimum 8)

1. Study of temperature transducers: (Any two)

a) RTD

b) Thermocouple

c) Thermistor

2. Study of displacement transducers: (Any two)

a) Inductive

b) Capacitive

c) Resistive

3. Study of weight measurement using strain gauge:

4. Study of speed measurement using : (Any one)

a) Magnetic pick up

b) Photoelectric pick up

5. Study of AC and DC bridges: (Any two)

a) Wheastones' bridge

b) Maxwell's bridge

c) Wein bridge

6. Measurement of frequency and phase using Lissageous patterns

7. Study of digital storage oscilloscope

8. Study of spectrum analyzer

9. Study of pressure measurement using bourdan tube

10. Study of DAC using R-2R ladder network

INDUSTRIAL ORGANIZATIONS AND MANAGEMENT (ETC 225)

Teaching scheme	**Examination scheme**
Lectures: 2 hrs / week	**Theory: CIE (50) + SEE (50) = 100 Marks**
Tutorial: 1 hr/ week	**IOE: 50 marks**

Unit.I. Introduction to Management (4 hrs)

Management, different functions of management: Planning, organizing, coordination and control. Structure of an industrial organization, Types of Organization, Functions of different departments. Relationship between individual departments.

Unit.II. Human and Industrial Relations (6 hrs)

Human relations and performance in organization, Understand self and others for effective behavior, Behaviour modification techniques, Industrial relations and disputes, Relations with subordinates, peers and superiors, Characteristics of group behaviour and trade unionism, Mob psycholog, Grievance, handling of grievances,

Agitations, strikes, lockouts, picketting and gherao, Labour welfare, Workers' participation in management. Functions of HRD manager: Introduction, Staff development and career development, Training strategies and methods.

Unit.III. Motivation and Leadership (4 hrs)

Factors determining motivation, Characteristics of motivation, Methods for improving motivation, Incentives, pay, promotion, rewards, Job satisfaction and job enrichment. Need for leadership, Functions of a leader, Factors for accomplishing effective, leadership, Manager as a leader.

Unit.IV. Materials Management (4 hrs)

Material in industry, inventory control model, ABC Analysis, Safety stock, Reorder, level, Economic ordering quantity, Stores equipment, Stores records, purchasing procedures, purchase records, Bin card, Cardex, Material handling, Manual lifting, Hoist, Cranes, conveyors, trucks, fork trucks.

Unit.V. Financial Management (3 hrs)

Important, ledger, Journal, Profit and Loss Account, Balance Sheet, Interpretation of Statements, Ration Analysis, Project financing, Project appraisal, return on investments.

Unit.VI. Marketing and Sales (3 hrs)

Sellers and Buyers markets, Marketing, Sales, Market conditions, monopoly, oligraphy, perfect competition, Cost Elements of Cost, Contribution, Break even analysis, Budgets, Pricing Policies.

REFERENCE AND TEXT BOOKS:

1. Industrial Engineering and Management by OP Khanna, Dhanpat Rai Publications, Delhi.
2. Industrial Engineering and Management by TR Banga.

PROGRAMMING TECHNIQUES – II (ETC226)

Teaching scheme **Examination scheme**

Lectures: 2 hrs / week

Practical: 2 hrs / week **IPE: 50 marks**

UNIT.1. Schematic Design **(8 Hrs)**

Introduction, Types of analysis, Description of simulation software tools (Multisim) Schematic Description: Introduction, Input files, element values, Nodes, circuit elements, sources, output variables, format of circuit and output files, drawing the schematic, Design rule Check (DRC), Netlist details.

UNIT.2. Simulation (8 hrs)

Types of Analysis: Bias point, Time domain, AC Sweep, DC Sweep, Parametric, Monte Carlo, Noise analysis.

UNIT.3. PCB Design (8 Hrs)

IC packages, Types of Connectors, Netlist for layout, Types of PCB's, Description of layout design tool, foot- print creation, Setting board parameter (board template, layer strategies), Component placement considerations, Routing strategies, Design Rule check, back annotation, post processing reports.

TEXT BOOK:

1. User manuals of, Multisim

2. W.C. Bosshart 'Printed Circuit Boards-Design & Technology'–Tata McGraw-Hill

Publication.

LIST OF EXPERIMENTS: (ANY 8 OF THE FOLLOWING)

1. Schematic drawing & component symbol creation

2. Hierarchical schematic drawing

3. Simulation and analysis (bias point analysis, time domain, AC sweep, DC sweep,

parametric) of :RLC Circuit

4. Simulation and analysis (bias point analysis, time domain, AC sweep, DC sweep,

parametric) of : Transistorized Circuit

5. Simulation and analysis (bias point analysis, time domain, AC sweep, DC sweep,

parametric) of : Two Stage Amplifier

6. Simulation and analysis (bias point analysis, time domain, AC sweep, DC sweep,

parametric) of : IC Based Circuits

7,8,9 Experiments based on PCB design, which would include component placement,

setting design rules, auto routing and interactive routing.

10. Experiments based on noise analysis and Monte-Carlo analysis

Note: Experiments may be based on the software MULTISIM

ENVIRONMENTAL STUDIES (HS 111)

Teaching scheme **Examination scheme**

Lectures: 2 hrs / week **Theory: 70 marks**

Project: 30 marks

UNIT.1. Nature of Environmental Studies: Definition, scope and importance.(2Hrs)

Multidisciplinary nature of environmental studies Need for public awareness.

UNIT.2. Natural Resources and Associated Problems. (8 Hrs)

a) Forest resources: Use and over-exploitation, deforestation, Timber extraction, mining, dams and their effects on forests and tribal people.

b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

c) Mineral resources: Usage and exploitation, environmental effects of extracting and using mineral resources.

d) Food resources: World food problem, changes caused by agriculture effects of modern agriculture, fertilizer-pesticide problems.

e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.

f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

g) Role of an individual in conservation of natural resources.

h) Equitable use of resources for sustainable lifestyle.

UNIT.3. Ecosystems (8 Hrs)

• Concept of an ecosystem

• Structure and function of an ecosystem

• Producers, consumers and decomposers

• Energy flow in the ecosystem

• Ecological succession.

• Food chains, food webs and ecological pyramids.

Introduction, types, characteristics features, structure and function of the following

Ecosystem: - a) Forest ecosystem,

b) Grassland ecosystem,

c) Desert ecosystem,

d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT.4. Biodiversity and its Conservation (8 Hrs)

• Introduction – Definition: genetic, species and ecosystem diversity.

• Biogeographical classification of India.

• Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.

• Biodiversity at global, National and local levels.

• India as a mega-diversity nation.

• Western Ghat as a bio-diversity region.

• Hot-spots of biodiversity.

• Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.

• Endangered and endemic species of India.

• Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT.5. Environmental Pollution (8 Hrs)

Definition: Causes, effects and control measures of:

a) Air pollution,

b) Water pollution,

c) Soil pollution,

d) Marine pollution,

e) Noise pollution,

f) Thermal pollution,

g) Nuclear hazards

• Solid waste Management: Causes, effects and control measures of urban and industrial wastes.

• Role of an individual in prevention of pollution.

• Pollution case studies

• Disaster management: Floods, earthquake, cyclone and landslides. Tsunami

UNIT.6. Social Issues and the Environment (8 Hrs)

• From Unsustainable to Sustainable development

• Urban problems related to energy

• Water conservation, rain water harvesting, watershed management

• Resettlement and rehabilitation of people; its problems and concerns.

• Environmental ethics: Issue and possible solutions.

• Climate change, Global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.

• Wasteland reclamation.

• Consumerism and waste products.

UNIT.7. Environmental Protection (8 Hrs)

• Environment Protection Act.

• Air (Prevention and Control of Pollution) Act.

• Water (Prevention and control of Pollution) Act

• Wildlife Protection Act

• Forest Conservation Act

• Population Growth and Human Health, Human Rights. (8 Hrs)

8. Field Work

• Visit to a local area to document environmental assetsriver/

forest/grassland/hill/mountain or

• Visit to a local polluted site – Urban/rural/Industrial/Agricultural or

• Study of common plants, insects, birds. or

• Study of simple ecosystems-ponds, river, hill slopes, etc.

(Field work Equal to 10 lecture hours)

Total = 60 hours

REFERENCES

1. Agarwal, K. C. 2001, Environmental Biology, Nidi Publ. Ltd., Bikaner.

2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad

380013, India, Email:mapin@icenet.net (R)

3. Brunner R. C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p

4. Clark R. S., Marine Pollution, Clanderson Press Oxford (TB) Pg No. 6

5. Cunningham, W. P. Cooper, T. H. Gorhani, E. & Hepworth, M. T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p

6. De A. K., Environmental Chemistry, Wiley Eastern Ltd.

7. Down to Earth, Centre for Science and Environment (R)

8. Gleick, H., 1993, Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute. Oxford Univ. Press 473p

9. Hawkins R. e., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)

10. Heywood, V. H. & Watson, R. T. 1995, Global Biodiversity Assessment, Cambridge Univ. Press 1140p.

11. Jadhav, H. & Bhosale, V. M. 1995, Environmental Protection and Laws, Himalaya Pub. House, Delhi 284p.

12. Mckinney, M. L. & Schocl. R. M. 1996, Environmental Science Systems & Solutions, Web enhanced edition, 639p.

13. Mhskar A. K., Matter Hazardous, Techno-Science Publications (TB)

14. Miller T. G. Jr., Environmental Science, Wadsworth Publishing Co. (TB)

15. Odum, E. P. 1971, Fundamentals of Ecology, W. B. Saunders Co. USA, 574p.

16. Rao M. N. & Datta, A. K. 1987, Waste Water Treatment, Oxford & IBH Publ. Co. Pvt. Ltd.,

17. Sharma B. K., 2001, Environmental Chemistry, Goel Publ. House, Meerut

18. Survey of the Environment, The Hindu (M)

19. Townsend C., Harper, J. and Michael Begon, Essentials of Ecology, Blackwell Science (TB)

20. Trivedi R. K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media (R)

21. Trivedi R. K. and P. K. Goel, Introduction to air pollution Techno-Science Publications (TB)

22. Wagner K. D., 1998, Environmental Management, W. B. Saunders Co.

Philadelphia, USA 499p.

(M) Magazine

(R) Reference

(TB) Textbook

23. Paryavaram Swhastra – Gholap T. N.

24. Paryavaram Shastra - Gharapure.

25. Paryavaran Vighyan - V. R. Ahirrao - Nirali Prakashan, Pune.

26. Paryavaram Shastra Parichay - Jay Kumar Magar Vidya Prakashan, Nagpur.

27. Desh Ka Paryavaran - Anupam Misra, Ganolai santi Pratisthan. New Delhi.

Equivalence of S.Y B.Tech (Electronics and communication Technology) Semester III & IV

The above detailed syllabus is a revised version of the S.Y.BTech (Electronics and communication Technology) course being conducted by the Shivaji University at the Department of Technology. This syllabus is to be implemented from June 2012.

The Equivalence for the subjects of Electronics and communication Technology at S.Y (B.Tech) Semester III and IV pre-revised course and revised course (Credit System) is as follows.

S.Y.B Tech Semester III (Electronics and communication Technology)

	S. Y. BTech (Electronics and communication Technology) Semester III **Pre-revised syllabus**	**S.Y. BTech (Electronics and communication Technology) Semester III** **Revised syllabus** **(Credit System)**	**Remark**
1.	Applied Mathematics	Engineering Mathematics-III	----------
2.	Electrical Technology	Electrical Technology	----------
3.	Electronics Circuit Analysis & Design -I	Electronics Circuit Analysis & Design -I	----------
4.	Linear Circuits	Linear Circuits	----------
5.	Digital Techniques	Digital Techniques	----------
6.	Programming Techniques-I	Programming Techniques-I	----------
7.	Environmental Studies	Environmental Studies	----------
8.	----------	Introduction to Performing Arts	**Newly added**

S.Y.B Tech Semester IV (Electronics and communication Technology)

	S.Y BTech (Electronics and communication Technology) Semester IV **Pre-revised syllabus**	**S.Y BTech (Electronics and communication Technology) Semester IV** **Revised syllabus** **(Credit System)**	**Remark**
1.	Electronics Circuit Analysis & Design -II	Electronics Circuit Analysis & Design -II	----------
2.	Communication Technology	Communication Technology	----------
3.	Processor Architecture	Processor Architecture	----------
4.	Measurement Techniques	Measurement Techniques	----------
5.	Industrial Organization	Industrial Organization and Management	----------
6.	Programming Techniques-II	Programming Techniques-II	----------
7.	----------	Introduction to foreign language	**Newly added**