DEPARTMENT OF TECHNOLOGY
SECOND YEAR B.TECH

Scheme of Teaching and Examination
Semester – III (Electronics & Telecommunication Engineering)
To be implemented from Academic Year 2021- 22

Course code	Course Title	Teaching Scheme (Hours / Week)				Examination Scheme (Marks)					
						Theory			Practical		
		L	T	P	Credit	Scheme	Max. marks	Min. Passing $	Scheme	Max. marks	Min. Passing
ETE211	Engineering Mathematics-III	04	---	---	04	CIE	30	40	--------	-------	--------
						SEE	70		--------	-------	--------
ETE212	Electronics Circuit Design –I	03	---	---	03	CIE	30	40	--------	-------	--------
						SEE	70		--------	-------	--------
ETE213	Network Analysis	03	---	---	03	CIE	30	40	--------	-------	--------
						SEE	70		--------	-------	--------
ETE214	Digital Electronics	03	---	---	03	CIE	30	40	--------	-------	--------
						SEE	70		--------	-------	--------
ETE215	Programming Techniques	03	---	---	03	CIE	30	40	--------	-------	--------
						SEE	70		--------	-------	---------
ETE211T	Engineering Mathematics-III Tutorial	---	01	---	01	--------	--------	--------	IOE	50	20
ETE216	Aptitude and Professional communication	03	---	02	04	--------	--------	--------	IOE	50	20
ETE212L	Electronics Circuit Design –I Laboratory	---	---	02	01	--------	--------	--------	EPE	50	20
ETE213T	Network Analysis Tutorial	---	01	---	01	--------	--------	--------	IOE	50	20
ETE214L	Digital Electronics Laboratory	---	---	02	01	--------	--------	--------	EPE	50	20
ETE215L	Programming Techniques Laboratory	---	---	02	01	--------	--------	--------	EPE	50	20
	Total	**19**	**02**	**08**	**25**	--------	**500**	--------	--------	**300**	--------

ES 218	Environmental Studies	02	---	---	---	Project*	30	40	--------	--------	------
						Theory*	70				
HS217	Introduction to Performing Arts	02	---	---	---	Evaluation at institute/ department level		Based on total marks obtained out of 50,the grade to be given by the course auditor			

Total contact hours per week: **29+2+2=33**

$ In theory student should appear for the CIE (Mid Semester Exam), submit the assignment and must secure 40% marks in SEE.

***** indicates Environmental Studies project evaluation and the theory examination will be at the end of the year i.e. along with Semester IV End Examination.

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 & Telecommunication Engineering)
To be implemented from Academic Year 2021- 22

Course code	Course Title	Teaching Scheme (Hours / Week)				Examination Scheme (Marks)					
						Theory			Practical		
		L	T	P	Credit	Scheme	Max. marks	Min. Passing $	Scheme	Max. marks	Min. Passing
ETE221	Electronics Circuit Design –II	03	---	---	03	CIE	30	40	--------	-------	--------
						SEE	70		--------	-------	--------
ETE222	Analog Communication	03	---	---	03	CIE	30	40	--------	-------	--------
						SEE	70		--------	-------	--------
ETE223	Linear Integrated Circuits	03	---	---	03	CIE	30	40	--------	-------	--------
						SEE	70		--------	-------	--------
ETE224	Measurements & Instrumentation	03	---	---	03	CIE	30	40	--------	-------	--------
						SEE	70		--------	-------	--------
ETE225	Data Structures	04	---	---	04	CIE	30	40	--------	-------	--------
						SEE	70		--------	-------	---------
ETE226	Industrial Organization and Management	03	01	---	04	--------	-------	--------	IOE	50	20
ETE221L	Electronics Circuit Design –II Laboratory	---	---	02	01	--------	-------	--------	EPE	50	20
ETE222L	Analog Communication Laboratory	---	---	02	01	--------	-------	--------	EPE	50	20
ETE223L	Linear Integrated Circuits Laboratory	---	---	02	01	--------	-------	--------	EPE	50	20
ETE224L	Measurements & Instrumentation Laboratory	---	---	02	01	--------	-------	--------	IPE	50	20
ETE225L	Data Structures	---	01	---	01	--------	-------	--------	IOE	50	20
	Total	**19**	**02**	**08**	**25**	--------	**500**	--------	--------	**300**	--------

ES218	Environmental studies project work	02	---	---	---	Project- 30 Theory-70	40			
EC227	Soft Skill Development	02	--	---	-----	Evaluation at institute/ department level	Based on total marks obtained out of 50,the grade to be given by the course auditor			

Total contact hours per week: **29+2+2=33**

$ In theory student should appear for the CIE (Mid Semester Exam), submit the assignment and must secure 40% marks in SEE.

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

Internship I which is a part of Semester V evaluation will be the activity after the SEE of semester IV. It is mandatory for all the students to undergo Internship I from standpoint of electronics engineering principles and report to the institute for the semester V along with the completion certificate by the concerned organization. The students have to submit a hard as well as soft copy of the activity report to the institute.

Equivalence of Second Year B.Tech (Electronics & Telecommunication Engineering) Semester III and IV

The above detailed syllabus is a revised version of the Second Year B.Tech (Electronics &Telecommunication Engineering) Program being conducted by the Shivaji University at the Technology Department of the University. This syllabus is to be implemented from June 2021. (Academic year 2021-22)

The Equivalence for the courses of Electronics &Telecommunication Engineering at Second Year B Tech Semester IIIand IV pre-revised Program under the faculty of Engineering and Technology is as follows.

Second Year B.Tech Semester III (Electronics & Telecommunication Engineering)

Sr.No	**Second YearB.Tech(Electronics & communication Technology) Semester III Pre-revised syllabus**	**Second YearB.Tech(Electronics & Telecommunication Engineering) Semester III Revised syllabus**	**Remark**
1.	Engineering Mathematics-III	Engineering Mathematics-III	Syllabus revised
2.	Electrical Technology	Electrical Technology	Course removed hence same course should be taken
3.	Electronics Circuit Analysis & Design-I	Electronics Circuit Design-I	Title changed and Syllabus revised
4.	Network Analysis	Network Analysis	Syllabus revised
5.	Digital Techniques	Digital Electronics	Title changed and Syllabus revised
6.	Programming Techniques	Programming Techniques	No change in contents
7.	Environmental studies	Environmental studies	No change in contents
8	Introduction to performing arts	Introduction to performing arts	No change in contents
9.		Aptitude and professional communication	New course added

Second Year B.Tech Semester IV (Electronics & Telecommunication Engineering)

Sr.No	Second YearB.Tech(Electronics & communication Technology) Semester IV Pre-revised syllabus	Second Year B.Tech(Electronics & Telecommunication Engineering)Semester IV Revised syllabus	Remark
1.	Electronics Circuit Analysis & Design-II	Electronics Circuit Design-II	Title changed and Syllabus revised
2.	Communication Technology	Analog Communication	Title changed and Syllabus revised
3.	Measurement Techniques	Measurements & Instrumentation	Title changed and Syllabus revised
4.	Industrial Organization and Management	Industrial Organization and Management	Syllabus revised
5.	Linear Integrated Circuits	Linear Integrated Circuits	Syllabus revised
6.	Data Structures	Data Structures	Syllabus revised
7.	Environmental studies	Environmental studies	No change in contents
8.	Soft skill development	Soft skill development	No change in contents

Audit course have not been assigned any credits. The students will be evaluated for these courses by the concerned course in charge. There will be grade conferred to the student. The grade will be based on conversion of marks obtained out of 50. (Obtaining passing grade is essential). Please refer to chart in the detail examination scheme. The chart shows the marks range and the respective grade.

Class, Part & Semester	**:**	**Second Year B. Tech (Electronics and Telecommunication Engineering), Part II, III**					
Course Title	**:**	**Engineering Mathematics-III**			***Course Code*:**	**:**	ETE211
Teaching Scheme (Hours)	**:**	Lecture : 4 Hrs/week Tutorial : 1 Hrs/week			***Total Credits***	**:**	05
Evaluation Scheme (Marks)	**:**	CIE=30 (20+10)	SEE = 70	Grand Total=100	***Duration of SEE***	**:**	3 hrs
Revision:	**:**	Fourth			***Month***	**:**	June 2021
Pre-requisites *(if any)*	**:**	Basic knowledge of Engineering Mathematics-I and Engineering Mathematics-II.					
Course Domain	**:**	Basic Sciences					

Course Rationale:
This course offers a mathematical understanding for engineering applications. This course produce graduates with mathematical knowledge, computational skills and the ability to deploy these skills effectively in the solution of problems, principally in the area of engineering.

Course Objectives: The Course teacher will		***Course Outcomes:*** Students will be able to	
1.	Study Linear differential equations	**1.**	Solve linear differential equations and apply them on simple electric circuit.
2.	Study Partial differential equations	**2.**	Solve the problems on partial differential equations.
3.	Study Laplace transform	**3.**	Gain the basic knowledge of Laplace transform and their applicability in solving initial value problems.
4.	Study Fourier series and transform	**4.**	Understands the new notion of Fourier series, Fourier transform and their usability.
5.	Study Probability	**5.**	To solve engineering problems using Probability.
6.	Study Vector differentiation.	**6.**	Analyze and solve engineering problems using vector differentiation.

Curriculum Content	**Hours**
UNIT-I Linear Differential Equations Linear Differential Equations with constant coefficients, Homogenous Linear differential equations, method of variation of parameters, Applications of LDE with constant coefficients to Electrical systems.	8
UNIT-II Partial Differential Equation Four standard forms of partial differential equation of first order.	8
UNIT–III Laplace Transform Definition, properties of Laplace transforms, transforms of derivatives, transforms of	9

integral, Inverse Laplace transforms, Convolution theorem. Applications to initial value boundary problems, Heaviside Unit step function, Diracdelta function, Periodic function.	
UNIT-IV Fourier series and Fourier transform Fourier series- Fourier Cosine series, Fourier sine series, Half range cosine series, half range sine series, full range series, Fourier transforms- Fourier sine and cosine transforms, complex form of Fourier integral, Finite Fourier sine and cosine transforms.	9
UNIT- V Probability 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.	9
UNIT -VI Vector Differentiation 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.	9

Suggested list of Tutorials/Assignments-

1. To find solution of LDE with constant coefficients
2. Examples of Homogeneous LDE
3. Problems on Partial differential equations
4. Examples on Properties of Laplace transform
5. Examples on Inverse Laplace transform
6. Examples on Fourier series
7. Examples on Fourier transform
8. Examples on Probability
9. Examples on Divergence
10. Examples on Curl

General Instructions:

1. Batch wise tutorials are to be conducted. The number of students per batch should be as per the practical batches.
2. Students must be encouraged to solve engineering mathematics problems using different software's in tutorial class only.

Each Student has to write at least 6 assignments on entire syllabus.

Suggested Text Books:

1.	Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons.
2.	B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, Delhi.
3.	N. P. Bali, Iyengar "A text book of Engineering Mathematics by", Laxmi Publications (P)Ltd., New Delhi.

Suggested Reference Books:

1.	C. R. Wylie, "Advanced Engineering Mathematics", McGraw Hill Publication, New Delhi.
2.	H. K. Dass, "Advanced Engineering Mathematics", S. Chand Publishing.
3.	S. S. Sastry, "Engineering Mathematics (Volume-I)", Prentice Hall Publication, New Delhi.

4.	M. D. Greenberg, "Advanced Engineering Mathematics", Pearson Education.
5.	J. N. Wartikar & P. N.Wartikar , "A text book of Applied Mathematics: Vol. I, II and III" Vidyarthi Griha Prakashan, Pune.
6.	Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi,

Class, Part & Semester	:	**Second Year B. Tech (Electronics & Telecommunication Engineering), Part II, III**					
Course Title	:	**Electronics Circuit Design- I**			***Course Code*:**	:	ETE212
Teaching Scheme (Hours)	:	Lecture : 03 Hrs/week Tutorial : 00 Hrs/week			***Total Credits***	:	03
Evaluation Scheme (Marks)	:	CIE=30 (20+10)	SEE = 70	Grand Total=100	***Duration of SEE***	:	3 hrs
Revision:	:	Fourth			***Month***	:	June 2021
Pre-requisites *(if any)*	:	BS-11A1, ES-11A3, ES-11A6, ES-12A3					
Course Domain	:	Core					

Course Rationale: This course deals with design and implementation aspects of primitive power supply and amplifier circuits.

Course Objectives: The Course teacher will		***Course Outcomes:*** Students will be able to	
1.	Illustrate the rectifier design	**1.**	Analyze and design rectifier circuits
2.	Illustrate properties of unregulated power supply	**2.**	Analyze and design the unregulated power supplies
3.	Discuss the need of regulated power supply	**3.**	Analyze and design voltage regulator circuits
4.	Provide case study of primitive power supply design	**4.**	Design compact regulated power supplies
5	Discuss the need of biasing circuits	**5**	Describe the transistor biasing circuits
6	Discuss the working principle of voltage amplifiers	**6**	Analyze and design voltage amplifiers

Curriculum Content	**Hours**
Unit I - Rectifier analysis and design Half wave rectifier, full wave rectifier, bridge rectifier, analysis and comparison of different parameters like PIV, TUF, efficiency, ripple factor, regulation, etc. specifications and ratings of diodes and transformers. Design of rectifier circuits.	6
Unit II- Filters and unregulated power supplies Filters, need of filters, types of filters- C filter, L filter, LC filter, CLC filter, RC filter, ripple factor and regulation based analysis, design of all filters, advantages, disadvantages and applications of unregulated power supplies , Design of unregulated power supplies with filters	6
Unit III- Voltage regulator circuits Need of voltage regulator circuits, Stabilization factors, Analysis & Design of zener voltage regulator, transistorized series and shunt voltage regulators , transistor series voltage regulator with error amplifier, protection circuits	6

Unit IV- IC Regulators Study and design of regulators using IC's:78XX, 79XX, IC 723, LM317, Switching regulator: Introduction and study of LM3524 IC	6
Unit V- Transistor Biasing Need of biasing, DC load line analysis, operating point, thermal runaway. Analysis of different biasing circuits: fixed bias, collector to base bias & voltage divider bias. Stability factor, General expression for stability factor, design of biasing circuits, Compensation techniques: Thermistor and diode compensation	6
Unit VI- Design of Voltage Amplifiers CE,CB & CC configurations , Generalized H-parameter analysis of transistor amplifier for Voltage Gain, Current gain, Input resistance & Output resistance taking Rs into consideration, Classification of voltage amplifiers based on feedback, Design of Single stage RC coupled amplifier , 2 stage RC coupled amplifier, multistage amplifiers, Frequency response of single stage RC coupled amplifier, direct coupled amplifier, transformer coupled amplifier	6

Suggested list of Tutorials and Assignments:

Design, simulation and implementation of primitive type power supply .

Case study

General Instructions: The final theory paper should consists of at least 60 % design/ numerical based questions

Suggested Text Books:	
1.	J. B. Gupta, 'Electronics Devices and Circuits' , Katson Books
Suggested Reference Books:	
1.	Robert L. Boylsted, Louis Nashelsky- 'Electronic devices & circuit theory'- 9th edition- Pearson Education
2.	David A. Bell –'Electronic devices & circuits'- 4th Edition- Prentice- Hall India
3.	Manufacturer data sheets

Class, Part & Semester	:	**Second Year B. Tech (Electronics & Telecommunication Engineering), Part II, III**					
Course Title	:	**Network Analysis**			***Course Code*:**	:	**ETE213**
Teaching Scheme (Hours)	:	Lecture : 3 Hrs/week Tutorial : 1 Hrs/week			***Total Credits***	:	4
Evaluation Scheme (Marks)	:	CIE=30 (20+10)	SEE = 70	Grand Total=100	***Duration of SEE***	:	3 hrs
Revision:	:	Fourth			***Month***	:	June 2021
Pre-requisites *(if any)*	:	Engineering Mathematics I and II, Electronic devices and circuits					
Course Domain	:	Core					

Course Rationale: This course will give fundamental knowledge of linear electronic circuits , the network theorems, two-port networks , filters , attenuators and their analysis.

Course Objectives: The Course teacher will		***Course Outcomes:*** Students will be able to	
1.	To introduce basic theorems used for network analysis.	**1.**	Apply appropriate network theorem to find circuit solution.
2.	To teach two port networks and its parameters.	**2.**	Understand AC resonant circuits.
3.	To clarify series and parallel resonance and its use.	**3.**	Solve circuit using different network theorems.
4.	To demonstrate linear system behaviour using pole zero plot.	**4.**	Calculate parameters of two port network.
5.	To impart design methods filters.	**5.**	Simulate different R-L-C circuits for AC/DC input.
6	To impart design methods attenuators.	**6**	Design different filters and attenuator.

Curriculum Content	**Hours**
Unit I CIRCUIT FUNDAMENTALS 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:-Thevenins Theorem, Nortans Theorem, Maximum Power Transfer Theorem, Superposition Theorem, Millmans theore	06
Unit II RESONANCE CIRCUITS Series resonance circuit, Frequency response of a series resonant circuit, 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	06
Unit III TWO- PORT NETWORK Two- port network parameters: y, z, h, A B C D Inter-conversion of two port networks, cascade connection series connection, series parallel connection, T and π network representation of a two port network.	06

Unit IV NETWORK FUNCTIONS Transform of circuit elements, Network functions, Stability, Transient response: - step input response in R-L circuit, step input response in R-C circuit, step input response in R-L-C circuit	06
Unit V FILTERS Definitions, classification and characteristics of different filters, decibel, neper. Design and analysis of constant K filter (low pass, high pass, band pass, and band stop filters): T and PI sections.	06
Unit VI ATTENUATORS Definitions, classification, relation between neper and decibel, analysis and design of T type, π type, lattice, bridged –T and L types attenuators.	06

Suggested Text Books:	
1.	A.Sudhakar, Shymmohan S. Palli, 'Circuit and Network – Analysis and Synthesis', 3rd Edition, Tata McGraw Hill Publication.
Suggested Reference Books:	
1.	D. Roy Choudhuri, 'Networks and Systems', New Age International Publisher.
2.	A. Chakrabarti, 'Circuit theory (Analysis and Synthesis)', IIIrd edition, Dhanpat Rai and Co.
3.	M.E.Van Valkenburg, 'Network Analysis', IIIrd edition, Pearsons Education/PHI.
4.	Josheph Edministrar, 'Theory and Problems of Electronic Circuit (Schaum's Series) – Tata McGraw Hill Publication.
5.	Soni Gupta, 'Electrical Circuit Analysis', Dhanpat Rai and Co.
6.	Boylestad, 'Introductory Circuit Analysis', Universal Book Stall, New Delhi.

Class, Part & Semester	**:**	**Second Year B. Tech (Electronics and Telecommunication Engineering), Part II, III**					
Course Title	**:**	**Digital Electronics**			***Course Code*:**	**:**	**ETE214**
Teaching Scheme (Hours)	**:**	Lecture :	3 Hrs/week		***Total Credits***	**:**	**03+01= 04**
Evaluation Scheme (Marks)	**:**	CIE=30 (20+10)	SEE = 70	Grand Total=100	***Duration of SEE***	**:**	3 hrs
Revision:	**:**	Fourth			***Month***	**:**	June 2021
Pre-requisites *(if any)*	**:**	___					
Course Domain	**:**	Core					

Course Rationale: : This course deals with analysis and design of various digital electronic circuits with its applications.

Course Objectives: The Course teacher will		***Course Outcomes:*** Students will be able to	
1.	Introduce fundamental concept of digital techniques.	**1.**	Understand number systems and its arithmetic operations and Illustrate use of Boolean algebra.
2.	Enhance basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.	**2.**	Formulate and apply Karnaugh Map to reduce Boolean expressions and logic circuits to their simplest forms.
3.	Conduct the analysis and design of various digital electronic circuits.	**3.**	Design of combinational circuits like comparators multiplexers, de-multiplexers, encoder, decoder and different code converters.
4.	Develop a skill to build and troubleshoot digital circuits.	**4.**	Understand working of flip-flops, its characteristics and conversion using truth table
		5	Design of sequential circuits like counters and shift registers.
		6	Understand logic families and interfacing of it also Remembering concept of memory technology

Curriculum Content	**Hours**
Unit I Binary Codes and Boolean algebra Binary Number System. Addition, Subtraction, Multiplication, Division of binary numbers, Subtraction using 2's complement method. Binary codes: weighted and non weighted codes, self complementary codes, BCD, Gray codes, Alphanumeric codes, ASCII Codes. Boolean algebra: Boolean Laws and Expression using Logic Gates, Realization of different gates using Universal gates, De-Morgan's Theorem, Duality Theorems.	05
Unit II Boolean Function minimization Techniques Standard forms: SOP, POS, Simplification of Switching function & representation (Maxterm & Minterm), Boolean expression & representation using logic gates, Propagation delay in	06

logic gate. Karnaugh map: K-map, 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	
Unit III Combinational Circuits Design Adder & Subtractor(Half and Full), Parallel Binary adder, BCD Adder, Code Converters, Comparators, Decoder, BCD to 7-segment Decoder, Encoders, Priority Encoders, Multiplexers, De Multiplexers.	07
Unit IV Sequential Circuits Elements Introduction to sequential circuit, Flip-flop & Timing Circuits: SR latch, Gated latch, Tri state logic, Edge triggered flip-plop: - D, JK, T Flip-flop, flip-flop asynchronous inputs ,characteristic table of Flip-flop, excitation table of Flip-flop, master slave JK flip flop, inter conversion of Flip-flop.	07
Unit V Shift Registers and Counters Shift registers: buffer register, controlled buffer register. Data transmission in shift resistor SISO, SIPO, PISO, PIPO, Bidirectional shift register, universal shift registers. Counter: Classification, Ripple or asynchronous counter, Effect of propagation delay in ripple counters, up-down counter, Design of Mod-n counter, synchronous counter, Ring counter, Johnson counter.	07
Unit VI Logic Families and Memory Technology Digital IC specification terminology, Logic families: TTL, CMOS families, comparison of TTL & CMOS, Memory Technology: Memory organization, Classification of Memory.	04

Suggested Text Books:	
1.	A. Anand Kumar 'Fundamentals of Digital Circuits'. PHI Publications
2.	R.P. Jain-'Modern Digital Electronics' IIIrd Edition- Tata Mc Graw Hill, Publication
Suggested Reference Books:	
1.	M. Morris Mano 'Digital Design' (Third Edition). PHI Publications
2.	Willim I. Fletcher.'An Engineering Approach to Digital Design' PHI
3.	Norman Balabanian Bradle Carlson. 'Digital Logic Design Principals.' Wiley Publication.
4.	Rajkamal 'Digital Systems Principals and Design' Pearson Education
5.	A.P. Malvino, D.P. Leach 'Digital Principles & Applicatios' -VIth Edition-TMH publication.

Class, Part & Semester	**:**	**Second Year B. Tech (Electronics & Telecommunication Engineering) Part II, Semester III**					
Course Title	**:**	**Programming Techniques**			***Course Code*:**	**:**	**ETE215**
Teaching Scheme (Hours)	**:**	Lecture : 03 Hrs/week Tutorial : -- Hrs/week			***Total Credits***	**:**	03
Evaluation Scheme (Marks)	**:**	CIE=30 (20+10)	SEE = 70	Grand Total=100	***Duration of SEE***	**:**	3 hrs
Revision:	**:**	Fourth			***Month***	**:**	June 2021
Pre-requisites *(if any)*	**:**	Basics of computer fundamentals, C Programming					
Course Domain	**:**	Core					

Course Rationale: This course intends to teach the students the basic concepts of object-oriented programming (OOP) that can be applied to solve real world problems. Because of complex nature of real world problems, programs are prone to error and programming errors can become expensive. Object-Oriented Programming offers a new and powerful way to coupe with this complexity. Its goal is clearer, more reliable, more easily maintained programs. This course will act as backbone for all other subjects that are based on Object Oriented concept.

Course Objectives: The Course teacher will		***Course Outcomes:*** Students will be able to	
1.	Inculcate fundamentals of programming techniques in students and to make their skills competent to industry.	**1.**	Explain object-oriented features using C++.
2.	Introduce the students to syntax and semantics of the C++ programming language.	**2.**	Design C++ classes for code reuse and implementation using objects.
3.	Generate awareness in students about various compilers and Integrated Development Environments used in industry.	**3.**	Utilize constructors and destructors for code realiability
4.	Introduce techniques for encapsulation, polymorphism and other OOP features.	**4.**	Implement dynamic binding with polymorphism using inheritance.
5.		**5.**	Articulate use of pointers in c++.
6.		**6.**	Understand file handling in c++.

Curriculum Content	**Hours**
Unit I: Introduction 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.	**07**
Unit II: Classes & Objects Specifying class, defining member function, making an outside function inline, Nesting member	**07**

function, private member function, Arrays within a class, memory allocation for objects, Array of objects, pointer to members.	
Unit III: Constructors and Destructors 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.	**06**
Unit IV: Polymorphism & Inheritance 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	**06**
Unit V: Pointers Pointers to objects, this pointer, pointer to derived classes	**04**
Unit VI: File handling Classes for file stream operations, opening and closing of files, file modes, file pointer & their manipulations, sequential I/O operations.	**06**

Suggested list of Tutorials and Assignments:

General Instructions :

suggestion for question paper setter : 60% questions should be based on programming and 40% on theoretical aspects.

Suggested Text Books:	
1.	E Balgurusamy –'Object oriented programming with C++' -, IInd Edition- Tata McGraw Hill Publication
2.	Y Kanetkar- 'Let Us C++', BPB Publications
Suggested Reference Books:	
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

Class, Part & Semester	**:**	**Second Year B. Tech (Electronics and Telecommunication Engineering), Part II, III**					
Course Title	**:**	**Engineering Mathematics-III Tutorial**			***Course Code*:**	**:**	ETE211T
Teaching Scheme (Hours)	**:**	Lecture : 4 Hrs/week Tutorial : 1 Hrs/week			***Total Credits***	**:**	05
Evaluation Scheme (Marks)	**:**	CIE=30 (20+10)	SEE = 70	Grand Total=100	***Duration of SEE***	**:**	3 hrs
Revision:	**:**	Fourth			***Month***	**:**	June 2021
Pre-requisites *(if any)*	**:**	Basic knowledge of Engineering Mathematics-I and Engineering Mathematics-II.					
Course Domain	**:**	Basic Sciences					

Course Rationale:
This course offers a mathematical understanding for engineering applications. This course produce graduates with mathematical knowledge, computational skills and the ability to deploy these skills effectively in the solution of problems, principally in the area of engineering.

Course Objectives: The Course teacher will		***Course Outcomes:*** Students will be able to	
1.	Study Linear differential equations	**1.**	Solve linear differential equations and apply them on simple electric circuit.
2.	Study Partial differential equations	**2.**	Solve the problems on partial differential equations.
3.	Study Laplace transform	**3.**	Gain the basic knowledge of Laplace transform and their applicability in solving initial value problems.
4.	Study Fourier series and transform	**4.**	Understands the new notion of Fourier series, Fourier transform and their usability.
5.	Study Probability	**5.**	To solve engineering problems using Probability.
6.	Study Vector differentiation.	**6.**	Analyze and solve engineering problems using vector differentiation.

Curriculum Content	**Hours**
UNIT-I Linear Differential Equations Linear Differential Equations with constant coefficients, Homogenous Linear differential equations, method of variation of parameters, Applications of LDE with constant coefficients to Electrical systems.	8
UNIT-II Partial Differential Equation Four standard forms of partial differential equation of first order.	8
UNIT–III Laplace Transform Definition, properties of Laplace transforms, transforms of derivatives, transforms of	9

integral, Inverse Laplace transforms, Convolution theorem. Applications to initial value boundary problems, Heaviside Unit step function, Diracdelta function, Periodic function.	
UNIT-IV Fourier series and Fourier transform Fourier series- Fourier Cosine series, Fourier sine series, Half range cosine series, half range sine series, full range series, Fourier transforms- Fourier sine and cosine transforms, complex form of Fourier integral, Finite Fourier sine and cosine transforms.	9
UNIT- V Probability 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.	9
UNIT -VI Vector Differentiation 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.	9

Suggested list of Tutorials/Assignments-

1. To find solution of LDE with constant coefficients
2. Examples of Homogeneous LDE
3. Problems on Partial differential equations
4. Examples on Properties of Laplace transform
5. Examples on Inverse Laplace transform
6. Examples on Fourier series
7. Examples on Fourier transform
8. Examples on Probability
9. Examples on Divergence
10. Examples on Curl

General Instructions:

1. Batch wise tutorials are to be conducted. The number of students per batch should be as per the practical batches.
2. Students must be encouraged to solve engineering mathematics problems using different software's in tutorial class only.

Each Student has to write at least 6 assignments on entire syllabus.

Suggested Text Books:

1.	Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons.
2.	B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, Delhi.
3.	N. P. Bali, Iyengar "A text book of Engineering Mathematics by", Laxmi Publications (P)Ltd., New Delhi.

Suggested Reference Books:

1.	C. R. Wylie, "Advanced Engineering Mathematics", McGraw Hill Publication, New Delhi.
2.	H. K. Dass, "Advanced Engineering Mathematics", S. Chand Publishing.
3.	S. S. Sastry, "Engineering Mathematics (Volume-I)", Prentice Hall Publication, New Delhi.

4.	M. D. Greenberg, "Advanced Engineering Mathematics", Pearson Education.
5.	J. N. Wartikar & P. N.Wartikar , "A text book of Applied Mathematics: Vol. I, II and III" Vidyarthi Griha Prakashan, Pune.
6.	Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi,

Class, Part & Semester	**:**	**S. Y. B.Tech (Electronics and Telecommunication Engineering) Part II, Semester III**					
Course Title	**:**	**Aptitude and Professional Communication**			***Course Code*:**	**:**	**ETE216**
Teaching Scheme (Hours)	**:**	Lecture : 03 Hrs/week Tutorial : -- Hrs/week			***Total Credits***	**:**	03
Evaluation Scheme (Marks)	**:**	CIE=30 (20+10)	SEE = 70	Grand Total=100	***Duration of SEE***	**:**	3 hrs
Revision:	**:**	Fourth			***Month***	**:**	June 2021
Pre-requisites	**:**	----					
Course Domain	**:**	Social Science					

Course Rationale: *In this course students will learn about aptitude which is prime requirement in all higher education examinations like GATE, CAT, CET, GRE etc. This course is also important in the selection process during campus placement. The abilities of writing, reading and speaking help students in the professional career.*

Course Objectives: The Course teacher will		***Course Outcomes:*** Students will be able to	
1.	Prepare for quick Aptitude solution.	**1.**	Solve quantitative aptitude.
2.	Improve logical reasoning ability	**2.**	Develop logical thinking ability.
3.	Improve communication ability	**3.**	Make oral communication effectively with team or individual.
4.	Practice group discussion skills	**4.**	Write report / email / resume / technical paper.
5.	Improve presentation skills	**5.**	Demonstrate participation in group discussion.
6.		**6.**	Demonstrate basic interview skills.

Curriculum Content	**Hours**
Unit I Quantitative Aptitude 1 HCF and LCM, Permutations and combinations, Probability, Ratio and Proportion, Percentage and average.	06
Unit II Quantitative Aptitude 2 Profit loss, Ages, square and square root, cube and cube root, Series, progression and sequence, fraction, simple and compound interest.	08
Unit III Quantitative Aptitude 3 Time and work, work and wages, problems on trains, clock, calendar, time distance, data analysis.	08
Unit IV Logical Reasoning Analogy, classification, series completion, coding, blood relation, logical word sequence, decision making, Venn diagram.	06
Unit V Professional Communication 1 *Writing skills:* Report writing, E-mail writing, technical paper writing, proposal writing. *Verbal Communication:* Public speaking, Public psychology, Interpersonal communication, Accent, Presentation skill.	04

Unit VI: Professional Communication 2 Group Discussion, resume writing and Interview technique - Technical, HR and telephonic. Body language.	02

Assignments: Based on any of the following activity

- The practical work includes minimum 8 assignments – practice based sessions on following topics.

1. Presentation using PPT
2. E mail Writing
3. Preparing student resume
4. Practical sessions on group discussion
5. Writing of technical paper
6. Writing of synopsis and report / proposal
7. Writing applications / request letter
8. Practice questions on quantitative aptitude and reasoning
9. Activities for English speaking / general communication

- Group task / activity for learning of team work / leadership / personality development.

Suggested Text Books:	
1.	Dr. R S Aggarwal ― Quantitative aptitude, S. Chand Publication.

Suggested Reference Books:	
1.	R V Praveen ― Quantitative aptitude and logical reasoning, 2nd Edition, PHI Publication.

Class, Part & Semester	:	**Second Year B. Tech (Electronics & Telecommunication Engineering), Part II, III**					
Course Title	:	**Electronics Circuit Design- I Laboratory**			***Course Code*:**	:	ETE212L
Teaching Scheme (Hours)	:	Practical :	02 Hrs/week		***Total Credits***	:	01
Evaluation Scheme (Marks)	:	IPE/IOE= NIL	EPE= 50	Total= 50	***Duration of EPE***	:	03 hrs
Revision:	:	Fourth			***Month***	:	June 2021
Pre-requisites *(if any)*	:	BS-11A1, ES-11A3, ES-11A6, ES-12A3					
Course Domain	:	Core					

Course Rationale: This course deals with design and implementation aspects of primitive power supply and amplifier circuits.

Course Objectives: The Course teacher will		***Course Outcomes:*** Students will be able to	
1.	Illustrate the rectifier design	**1.**	Analyze and design rectifier circuits
2.	Illustrate properties of unregulated power supply	**2.**	Analyze and design the unregulated power supplies
3.	Discuss the need of regulated power supply	**3.**	Analyze and design voltage regulator circuits
4.	Provide case study of primitive power supply design	**4.**	Design compact regulated power supplies
5	Discuss the need of biasing circuits	**5.**	Describe the transistor biasing circuits
6	Discuss the working principle of voltage amplifiers	**6**	Analyze and design voltage amplifiers

List of Experiments

Sr. No.	Minimum 8 experiments should be conducted from the list given below
1.	Study of ratings of Electronic components and lab equipment.
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.	Design of IC based fixed voltage regulators
10.	Design of IC based adjustable voltage regulators
11.	Determination of H-parameters from transistor CE characteristics.
12.	Calculation of performance parameters (Av, Ai, Ri, Ro) for single stage RC coupled amplifier
13.	Study of Frequency response of single stage RC coupled amplifier.
14.	Study of square wave response of RC coupled amplifier & calculation of Sag & rise time (tr).
15.	Design of multistage amplifier.
16.	Comparative study of voltage amplifiers (with & without feedback).

General Instructions: Any 8 experiments should be conducted in laboratory, out of 8 experiments 2 experiments must be based on any simulation tool.

Suggested Text Books/ Reference Books/Manual

1.	J. B. Gupta, 'Electronics Devices and Circuits' , Katson Books
2.	Robert L. Boylsted, Louis Nashelsky- 'Electronic devices & circuit theory'- 9th edition- Pearson Education
3.	David A. Bell –'Electronic devices & circuits'- 4th Edition- Prentice- Hall India
4.	Manufacturer data sheets

Class, Part & Semester	**:**	**Second Year B. Tech (Electronics & Telecommunication Engineering), Part II, III**					
Course Title	**:**	**Network Analysis Tutorial**			***Course Code*:**	**:**	ETE213T
Teaching Scheme (Hours)	**:**	Practical :	01 Hrs/week		***Total Credits***	**:**	01
Evaluation Scheme (Marks)	**:**	IPE/IOE= 50	EPE/EOE=Nil	Total=50	***Duration of EPE***	**:**	----
Revision:	**:**	Fourth			***Month***	**:**	June 2021
Pre-requisites *(if any)*	**:**	EC211,EC213					
Course Domain	**:**	Core					

Course Rationale: The course is to acquaint the students with practical knowledge of the basic concepts of electronic circuits, energy sources, circuit transformations, two-port networks, design of filters and attenuators. The students will be able to understand circuit fundamentals and its analysis **.**

Course Objectives: The Course teacher will		***Course Outcomes:*** Students will be able to	
1.	To introduce basic theorems used for network analysis.	**1.**	Apply appropriate network theorem to find circuit solution.
2.	To teach two port networks and its parameters.	**2.**	Understand AC resonant circuits.
3.	To clarify series and parallel resonance and its use.	**3.**	Solve circuit using different network theorems.
4.	To demonstrate linear system behaviour using pole zero plot.	**4.**	Calculate parameters of two port network.
5	To impart design methods filters.	**5.**	Simulate different R-L-C circuits for AC/DC input.

List of Tutorials

Sr. No.	Title of Tutorials
1.	Problems based on star and delta connections and their conversions
2.	Problems based on energy source transformations
3.	Problems based on series and parallel resonance circuits
4.	Problems based on z parameters of two –port networks
5.	Problems based on y parameters of two –port networks
6.	Problems based on h parameters of two –port networks
7.	Problems based on ABCD parameters of two –port networks

8.	Problems based on network functions
9.	Problems based on filter designs
10.	Problems based on attenuator designs
Suggested Text Books/ Reference Books/Manual	
1.	A.Sudhakar, Shymmohan S. Palli, 'Circuit and Network – Analysis and Synthesis', 3rd 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.

Class, Part & Semester	:	**Second Year B. Tech (Electronics and Telecommunication Engineering), Part II, III**					
Course Title	:	**Digital Electronics Laboratory**			***Course Code*:**	:	**ETE214L**
Teaching Scheme (Hours)	:	Practical :	2 Hrs/week		***Total Credits***	:	01
Evaluation Scheme (Marks)	:	IPE/IOE= Nil	EOE= 50	Total= 50	***Duration of EPE***	:	3 Hrs
Revision:	:	Fourth			***Month***	:	June 2021
Pre-requisites *(if any)*	:	—					
Course Domain	:	Core					

Course Rationale: : This course deals with analysis and design of various digital electronic circuits with its applications.

Course Objectives: The Course teacher will		***Course Outcomes:*** Students will be able to	
1.	Introduce fundamental concept of digital electronics.	**1.**	Understand number systems and its arithmetic operations and Illustrate use of Boolean algebra.
2.	Enhance basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.	**2.**	Formulate and apply Karnaugh Map to reduce Boolean expressions and logic circuits to their simplest forms.
3.	Conduct the analysis and design of various digital electronic circuits.	**3.**	Design of combinational circuits like comparators multiplexers, de-multiplexers, encoder, decoder and different code converters.
4.	Develop a skill to build and troubleshoot digital circuits.	**4.**	Understand working of flip-flops, its characteristics and conversion using truth table
		5.	Design of sequential circuits like counters and shift registers.
		6.	Understand logic families and interfacing of it also Remembering concept of memory technology

List of Experiments

Sr. No.	
1.	Study of basic gates

2.	Study of Universal gates (NAND, NOR)
3.	K map based implementation of combinational logic
4.	Half and Full Adder, Half and Full Subtractor
5.	4 bit parallel Adder / Subtractor using IC 7483
6.	Code Converters (Binary to Gray, Excess 3 to Binary)
7.	Comparator using IC 7485
8.	Implementation of combinational logic using MUX
9.	Study of Decoder and DEMUX (IC 74138)
10.	Study of 7 segment decoder driver. (IC 7447)
11.	Study of Flip Flops (SR FF, D FF, JK FF, T FF)
12.	Design Built and test MOD N counter
13.	Design Built and test Shift Register
14.	Design and implementation of Johnson Counter
15.	Design 3 bit sequence detector
Suggested Text Books/ Reference Books/Manual	
1.	M. Morris Mano 'Digital Design' (Third Edition). PHI Publications
2.	Willim I. Fletcher.'An Engineering Approach to Digital Design' PHI

Class, Part & Semester	:	**Second Year B. Tech (Electronics & Telecommunication Engineering) Part II, Semester III**					
Course Title	:	**Programming Techniques Laboratory**			***Course Code*:**	:	**ETE215L**
Teaching Scheme (Hours)	:	Practical :	02 Hrs/week		***Total Credits***	:	01
Evaluation Scheme (Marks)	:	IPE/IOE= -	EPE/EOE= 50	Total= 50	***Duration of EPE***	:	3 Hrs
Revision:	:				***Month***	:	June 2021
Pre-requisites *(if any)*	:	Basics of computer fundamentals, C Programming					
Course Domain	:	Core					

Course Rationale: This course intends to teach the students the implementation of object-oriented programming (OOP) that can be applied to solve real world problems. Because of complex nature of real world problems, programs are prone to error and this laboratory course will help them to navigate and debug such errors.

Course Objectives: The Course teacher will		***Course Outcomes:*** Students will be able to	
1.	Inculcate fundamentals of programming techniques in students and to make their skills competent to industry.	**1.**	Explain object-oriented features using C++.
2.	Introduce the students to syntax and semantics of the C++ programming language.	**2.**	Design C++ classes for code reuse and implementation using objects.
3.	Generate awareness in students about various compilers and Integrated Development Environments used in industry.	**3.**	Utilize constructors and destructors for code realiability
4.	Introduce techniques for encapsulation, polymorphism and other OOP features.	**4.**	Implement dynamic binding with polymorphism using inheritance.
5		**5.**	Articulate use of pointers in c++.
		6.	Understand file handling in c++.

List of Experiments

Sr. No.	
1.	Classes & objects
2.	Function overloading

3.	Constructors &Destructors
4.	Copy Constructor
5.	Unary operator overloading
6.	Binary operator overloading
7.	Friend function
8.	Friend class
9.	Inheritance
10.	Pointers and virtual function
11.	File handling

General Instructions: if any regarding course delivery and assessment

Large no. of programs should be practiced at the time of practical covering above aspects.

Suggested Text Books/ Reference Books/Manual

1.	E Balgurusamy –'Object oriented programming with C++' -, IInd Edition- Tata McGraw Hill Publication
2.	Herbert Schildt –'The Complete Reference C++' - IIIrd Edition - Tata McGraw Hill Publication
3.	Ravichandran D.-'Programming with C++ '-IInd Edition- Tata McGraw Hill Publication
4.	Robert Lafore –'C++ Programming' –. IV th Edition –Techmedia, New Delhi

Class, Part & Semester	:	**Second Year B. Tech (Electronics & Telecommunication Engineering), Part II , Semester III**					
Course Title	:	**Environmental Studies**			***Course Code***	:	ES218
Teaching Scheme (Hours)	:	Lecture : 02 Hours/Week Tutorial : 00 Hours/Week			***Total Credits***	:	Nil
Evaluation Scheme (Marks)	:	CIE = 00 SEE = 70	IPE=30 Project	: Grand Total=100	***Duration of SEE***	:	3 hrs. At the year end
Revision	:	Fourth			***Month***	:	June 2021
Pre-requisites *(if any)*	:	Completion of First Year Engineering, Revision of BS-12A2 namely Engineering Chemistry may help for better understanding.					
Course Domain	:	Environmental studies					

Course Rationale: The Course is all about learning the way we should live and how we can develop sustainable strategies to protect the environment. It helps individuals to develop an understanding of living and physical environment and how to resolve challenging environmental issues affecting nature.

Course Objectives: The Course Teacher will		***Course Outcomes:*** Students will be able to	
1.	Define the course and indicate the importance of the same to the students.	**1.**	Recognize the scope and need of the course.
2.	Enumerate the natural resources and make students visualize about associated problems.	**2.**	Identify the natural resources and detect the associated problems.
3.	Describe and relate the ecosystems the engineering graduates.	**3.**	Relate values of ecosystems to human, plants and animals.
4.	Explain concepts and theory in biodiversity and management from interdisciplinary perspectives.	**4.**	Identify key threats of biodiversity.

Curriculum Content	**Hours**
Unit I Nature of Environmental Studies: Definition, scope and importance, Significance of environmental studies, Multidisciplinary nature of environmental studies. Its need for public awareness.	05
Unit II Natural resources and associated problems: 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.	08
Unit III Ecosystems: 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,	08

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 IV Biodiversity and its conservation: Introduction – Definition: genetic, species and ecosystem diversity, Bio geographical 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 Ghats 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.	09

Suggested Text Books:	
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
3.	Brunner R. C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
Suggested Reference Books:	
1.	Clark R. S., Marine Pollution, Clanderson Press Oxford (TB) Pg No. 6
2.	Cunningham, W. P. Cooper, T. H. Gorhani, E. & Hepworth, M. T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p
3.	De A. K., Environmental Chemistry, Wiley Eastern Ltd.
4.	Down to Earth, Centre for Science and Environment (R)
5.	Gleick, H., 1993, Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute. Oxford Univ. Press 473p
6.	Hawkins R. e., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
7.	Heywood, V. H. & Watson, R. T. 1995, Global Biodiversity Assessment, Cambridge Univ. Press 1140p.
8.	Jadhav, H. & Bhosale, V. M. 1995, Environmental Protection and Laws, Himalaya Pub. House, Delhi, 284p.
9.	Mckinney, M. L. & Schocl. R. M. 1996, Environmental Science Systems & Solutions, Web enhanced edition
10.	Mhskar A. K., Matter Hazardous, Techno-Science Publications (TB)
11.	Miller T. G. Jr., Environmental Science, Wadsworth Publishing Co. (TB)
12.	Odum, E. P. 1971, Fundamentals of Ecology, W. B. Saunders Co. USA, 574p.
13.	Rao M. N. & Datta, A. K. 1987, Waste Water Treatment, Oxford & IBH Publ. Co. Pvt. Ltd.,
14.	Sharma B. K., 2001, Environmental Chemistry, Goel Publ. House, Meerut
15.	Survey of the Environment, The Hindu (M)
16.	Townsend C., Harper, J. and Michael Begon, Essentials of Ecology, Blackwell Science (TB)
17.	Trivedi R. K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media (R)
18.	Trivedi R. K. and P. K. Goel, Introduction to air pollution Techno-Science Publications (TB)
19.	Wagner K. D., 1998, Environmental Management, W. B. Saunders Co. Philadelphia, USA.

Class, Part & Semester	:	**Second Year B. Tech (Electronics & Telecommunication Engineering), Part II & Semester III**								
Course Title	:	**Introduction to Performing Arts**						***Course Code***	:	HS217
Teaching Scheme (Hours)	:	2 Hours /Week= 2 x13= 26 hours						***Total Credits***	:	Nil
Evaluation Scheme (Marks)	:	Assignments Viva voce	: :	50 25	Written Test Grand Total	: :	25 100	***Duration of SEE***	:	NA
Revision:	:	Fourth						***Month***	:	June 2021
Pre-requisites *(if any)*	:	No pre-requisite as such is needed however students' involvement and interest in the classroom will make it more lively activity.								
Course Domain	:	Humanities and Arts								

Course Rationale: Performing arts are an important part of our lives, our communication and our self-expression. These arts encourage learners to explore their emotions, expanding their imagination and helping them develop their own, unique voice. Each discipline, music, dance and drama, engage their brain, body and emotions in different ways to encourage their confidence and find joy in self-expression. So introducing the learner to such arts may be an interesting experience.

Course Assessment Method: The students will be given five assignments each for 10 marks. At the end of the course, there will be a written test of 25 marks and a viva voce of 25 marks. All these assessments will be for a total of 100 marks. Based on the marks obtained, they will be awarded with a grade similar to other credit courses. Though it is an audit course, obtaining passing grade is essential.

Course Objectives: The Course Teacher will		***Course Outcomes:*** Students will be able to	
1.	State about various performing arts and explain the importance of the same.	**1.**	Identify the types of performing arts and their differences with importance.
2.	Elucidate about drama, Natya-Shastra etc.	**2.**	Acquire knowledge about drama, Natya-Shastra, street play etc.
3.	Explain types of dance, will reveal about theaters.	**3.**	Demonstrate dance skills and organize about theater activities.
4.	Demonstrate about Rag and Taal.	**4.**	Receive and respond to the Rag and Taal.
5.	List Gharana system and classify Indian musical instruments.	**5.**	Identify Gharana and instruments of their choice and interest for practice
6.	Summarize contribution of great musicians and outline about music concerts	**6.**	Recognize contribution of great musicians and display performances for a music concert.

Curriculum Content	**Hours**
Unit I: Introduction to Music, Dance & Drama, History of Indian Music, Various Forms of Vocal Music.	04
Unit II: History and introduction of Drama, Bharat Muni Natya Shastra, street play, Sanskrit Natya, Marathi Sangit Rangbhumi.	04
Unit III: Dance, its type, Greek and Roman theatres.	04
Unit IV: Concept of Raga, Concept of Taal.	04
Unit V: Notation System, Study of Gharana system in Music, Classification of Indian Instruments, Instrumental Music.	05
Unit VI: Contribution of Great Musicians, Appreciation of Music. Performance of a Music Concert.	05

Suggested Reference Books:	
1.	Sangeet Visharad, Vasant, Sangeet Karyalaya, Hatras Prakashan.
2.	Suchita Bidkar, 'Sangeet Shastra Vigyan', Sanskar Prakashan.
3.	Sudhir Mainkar, 'Sangeet Kala Aani Shikshan', Sanskar Prakashan.
4.	Bhaskar Chandavarkar, 'Vadyavedh', Sanskar Prakashan.
5.	Arvind Mulgaonkar, 'Tabla', Popular Prakashan.
6.	Chris Hogget,'All about theatre-Off stage'.
7.	Mrinalini Sarabhai,'Understanding of Bharat Natyam'.
8.	Joan Borysenko ,'Minding the body and mending the mind'.
9.	V.K.Subbanna,'Ragadalli Antrang'.

Class, Part & Semester	:	**Second Year B. Tech (Electronics & Telecommunication Engineering), Part II, IV**					
Course Title	:	**Electronics Circuit Design- II**			***Course Code*:**	:	ETE221
Teaching Scheme (Hours)	:	Lecture : 03 Hrs/week Tutorial : 00 Hrs/week			***Total Credits***	:	03
Evaluation Scheme (Marks)	:	CIE=30 (20+10)	SEE = 70	Grand Total=100	***Duration of SEE***	:	3 hrs
Revision:	:	Fourth			***Month***	:	June 2021
Pre-requisites *(if any)*	:	BS-11A1, ES-11A3, ES-11A6, ES-12A3					
Course Domain	:	Core					

Course Rationale: This course deals with design and implementation aspects of various circuits using discrete components

Course Objectives: The Course teacher will		***Course Outcomes:*** Students will be able to	
1.	Illustrate the wave shaping circuit design	**1.**	Analyze and design the passive wave shaping circuits
2.	Illustrate working principle of multivibrators	**2.**	Analyze and design transistorized square and rectangular wave generator circuits
3.	Illustrate the design of oscillators	**3.**	Analyze and design transistorized sine wave generator circuits
4.	Discuss the power amplifier circuits	**4.**	Analyze and design power amplifier circuits
5	Discuss the working principle of FETs	**5**	Understand construction and working principle of JFETs and MOSFETs
6	Discuss the working principles of communication amplifier circuits.	**6**	Describe the working principle of tuned amplifier

Curriculum Content	**Hours**
Unit I- Wave Shaping Circuits 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	6
Unit II- 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	6
Unit III- Oscillators Barkhausen's criteria , Frequency and amplitude stability, Classification, **RC oscillators :** RC phase shift &	6

Wein bridge oscillator analysis & design using BJT, **LC oscillators:** Colpit's & Hartely's oscillators analysis and design using BJT, Crystal oscillator	
Unit IV- Power Amplifiers Need of Power amplifier, classification of power amplifier, Power considerations, Distortion in power amplifiers: Phase, Frequency, amplitude/ harmonic /nonlinear 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, class C amplifier	6
Unit V- FET & MOSFET JFET types, construction, working, characteristics and comparative study. MOSFET types, construction, working, characteristics and comparative study, Handling precautions of MOS devices, ratings and specifications of MOS, CMOS inverter	6
Unit VI- Tuned Amplifiers Introduction, Classification, single tuned amplifiers, double tuned amplifiers, large signal tuned amplifiers, oscillations in tuned amplifiers, stagger tuned amplifiers	6

Suggested list of Tutorials and Assignments:

Design, simulation and implementation of any discrete circuit.

General Instructions: The final theory paper should consists of at-least 60 % design based questions

Suggested Text Books:	
1.	J. B. Gupta, 'Electronics Devices and Circuits' , Katson Books
Suggested Reference Books:	
1.	Robert L. Boylsted, Louis Nashelsky- 'Electronic devices & circuit theory'- 9th edition- Pearson Education
2.	David A. Bell –'Electronic devices & circuits'- 4th Edition- Prentice- Hall India
3.	N.C. Goyal & R.K. Khetan-' A Monograph on Electronics Design Principles'-5th Edition- Khanna Publishers
4.	Manufacturer data sheets

Class, Part & Semester	**:**	**Second Year B. Tech (Electronics & Telecommunication Engineering), Part II, Semester IV**					
Course Title	**:**	**Analog Communication**			***Course Code*:**	**:**	ETE222
Teaching Scheme (Hours)	**:**	Lecture :	03 Hrs/week		***Total Credits***	**:**	03
		Tutorial :	00 Hrs/week				
Evaluation Scheme (Marks)	**:**	CIE=30 (20+10)	SEE = 70	Grand Total=100	***Duration of SEE***	**:**	3 hrs
Revision:	**:**	Fourth			***Month***	**:**	June 2021
Pre-requisites *(if any)*	**:**	ETE211Engineering Mathematics-III, ETE212 Electronics Circuit Design –I					
Course Domain	**:**	Core					

Course Rationale: Familiarize the students with basic analog communication systems. Integrate theory with practical so that the students appreciate the knowledge gained from the theory course about amplitude, frequency, pulse transmission and reception.

Course Objectives: The Course teacher will		***Course Outcomes:*** Students will be able to	
1.	To introduce and analyze techniques of generation, transmission and reception of amplitude modulation (AM) frequency modulation (FM) and phase modulation (PM) signals	**1.**	Understand the basic concepts, components of the analog communication system and effect of noise on it
2.	To introduce the pulse modulation and demodulation techniques.	**2.**	Analyze and compute modulation index, bandwidth and power requirements of amplitude modulation.
3.	To understand and analyze impact of noise on communication system	**3.**	Analyze and compute modulation index, bandwidth and power requirements of angle modulation such as FM & PM
4.	Analyze various communication receivers	**4.**	Analyze various analog pulse modulation and demodulation techniques.
		5.	Understand operation of AM receivers
		6.	Understand operation of FM receivers

Curriculum Content	**Hours**
Unit I Introduction Block schematic of communication system, Electromagnetic Spectrum, Necessity of modulation, Types of modulation – AM, FM, PM and Pulse Modulation. Noise types (Internal & External), Signal to Noise ratio, Noise factor, Noise figure	05

Unit II Amplitude Modulation Amplitude Modulation(AM) Techniques, Modulation index, % modulation, Power relations in AM Trapezoidal patterns, AM Generation: Low level and High Level Modulation, Modulator Circuits, AM transmitters, SSB Principle, Balanced modulator, SSB Generation Methods: Filter system, Phase shift & Third method ,Independent sideband system (ISB),Vestigial sideband(VSB)	07
Unit III Angle Modulation Theory of Angle Modulation Techniques, Practical Issues in Frequency Modulation(FM), FM and Phase Modulation(PM), Frequency deviation and Percentage Modulation, Deviation Sensitivity, Deviation ratio ,Phase Deviation and Modulation Index, Bandwidth Requirements (Numericals expected), Noise and Angle modulation, Narrow Band & Wide band FM, Pre-emphasis and de-emphasis, FM Modulators(Direct & Indirect methods) ,	07
Unit IV Analog Pulse Modulation Sampling Theorem, Sampling Types: Natural & Flat Top, Pulse Amplitude Modulation (PAM) & Demodulation, Pulse Width Modulation (PWM) & Demodulation, Pulse Position Modulation (PPM) & Demodulation, TDM and FDM,	05
Unit V AM Receivers Receiver Types: TRF and Superhetrodyne (Block Diagram), Receiver Parameters: Sensitivity, Selectivity, Bandwidth, Dynamic Range, Fidelity, RF Section – RF Amplifier, Mixer, Local Oscillator, IF Amplifier, AM Detection Types: Using Diode, Practical Diode Detector, Distortion in diode detector: Negative Peak Clipping & Diagonal Clipping, Automatic Gain Control (AGC)	07
Unit VI FM Receivers: Block diagram, Common Circuits- Comparison with AM Receivers, Amplitude Limiting, Basic FM Demodulators- Slope Detection, Phase Discriminator, Ratio Detector	05
Suggested Text Books:	
1.	George Kennedy, 'Electronics Communication System'--Tata McGraw Hill Publication.

2.	Wayne Tomasi, 'Electronics Communication Systems Fundamentals through Advanced' - Pearson Education.
Suggested Reference Books:	
1.	Louis E. Frenzel, 'Principles of Electronic Communication Systems' -Tata McGraw Hill Publication.
2.	Dennis Roddy, John Coolen, 'Electronics Communications '4th Edition-Pearson Education
3.	R P Singh, S D Sapre 'Communication System-Analog & Digital' 2nd Edition –Tata Mc Graw Hill Publication

Class, Part & Semester	**:**	**S. Y. B.Tech (Electronics and Telecommunication Engineering) Part II, Semester IV**					
Course Title	**:**	**Linear Integrated Circuits**			***Course Code*:**	**:**	**ETE 223**
Teaching Scheme (Hours)	**:**	Lecture :	03 Hrs/week		***Total Credits***	**:**	03
		Tutorial :	-- Hrs/week				
Evaluation Scheme (Marks)	**:**	CIE=30 (20+10)	SEE = 70	Grand Total=100	***Duration of SEE***	**:**	3 hrs
Revision:	**:**	Fourth			***Month***	**:**	June 2021
Pre-requisites	**:**	ES-11A3 / ES-12B3, ETE213					
Course Domain	**:**	Program Core					

Course Rationale:

Analog Circuits plays a vital role in the design of an electronic system. This course is detail study of important Analog / Linear Integrated Circuits (ICs). This course is a Circuit Design course planned to give exposure on use of operational amplifier (Op. Amp.) For Different applications and its significance in real world. It also includes other Analog ICs like Timer IC 555 and PLL.

Course Objectives: The Course teacher will		***Course Outcomes:*** Students will be able to	
1	Impart information about OPAMP 741 internal circuit and characteristics.	**1**	Analyze the internal circuits of op. amp. 741.
2	Explore OPAMP parameters	**2**	Analyze different op. amp. Parameters.
3	Explore OPAMP frequency response	**3**	Describe the open loop and closed loop frequency response of op. amp.
4	Discuss OPAMP linear and nonlinear applications	**4**	Analyze linear and non-linear applications of op. amp.
5	Discuss OPAMP based filters and signal generator	**5**	Design Filter and Signal generator circuits using op. amp.
6	Explore linear IC PLL and Timer 555	**6**	Describe the PLL and Timer IC with application circuits.

Curriculum Content	**Hours**
Unit I Op-Amp basics and Characteristics Differential amplifier: common mode, differential mode, configurations, DC and AC analysis, constant current bias, current mirror circuit, cascade diff-amp stages, level shifter. Block Diagram of Op-Amp, Study of μA 741: Ideal & Practical Op-amp specifications, Transfer characteristics of Op amp.	07
Unit II Op-Amp Parameters and basic Configurations *Op. Amp. Parameters*: offset voltages and offset currents with compensation techniques, Input Bias current, slew rate, CMRR, PSRR, Thermal drift, open loop gain, closed loop gain, Comparative study of OP 07, LM 741, LM 311. Open Loop & Closed Loop Inverting, Non inverting and Differential amplifier with analysis of parameters like Av, Ri, Ro, Bandwidth.	07
Unit III Op-Amp frequency response	02

Open loop and closed loop frequency response, unity gain BW, need for compensation, Internal and external compensated op amps and frequency response, effect of slew rate.	
Unit IV Op-Amp Applications Summing amplifier, Subtractor, Integrator, Differentiator, Instrumentation Amplifier, I to V and V to I converters. Comparators, Zero Crossing Detector, Window detector, Schmitt trigger, peak detector, log and antilog amplifier, precision rectifier, sample and hold circuit, clippers and clampers.	08
Unit V Op-Amp Active Filters and signal generators *Filters:* First & Second Order Butterworth Low Pass, High Pass, Band Pass, Band Reject and All Pass Filters. *Signal generators:* RC phase Shift, Wein Bridge, Hartely, Colpitts oscillators, opamp as multivibrators and triangular wave generators.	08
Unit VI PLL and Timer *Phase Lock Loop:* Introduction, Operating principle, Study of Block Diagram of PLL, case study IC 565 PLL and application, *Timer IC 555*: block diagram, IC 555 as astable, monostable, bistable multivibrators, VCO.	04

Assignments: Based on any of the following activity

- Survey report on Different Op.amp. and their comparative study.
- Seminar on different topics based on curriculum.
- Design of the small application using Op. amp or IC555.
- Solving questions from previous GATE examination based on Op. amp and IC555 circuits.

Suggested Text Books:	
1.	Ramakant. A.Gayakwad ― Op-Amps & Linear Integrated Circuits, 3rd Edition, PHI.
2.	S.Salivahanan & Bhaaskaran ―Linear Integrated Circuits, 1st Edition, Tata McGraw Hill
Suggested Reference Books:	
1.	Sergio Franco ―Design with op-amp & Analog Integrated Circuits, Tata McGraw Hill.
2.	J. Michael. Jacob ―Application & Design with Analog Integrated Circuits, PHI.

Class, Part & Semester	**:**	**Second Year B. Tech (Electronics & Telecommunication Engineering), Part II, IV**					
Course Title	**:**	**Measurements and Instrumentation**			***Course Code*:**	**:**	**ETE 224**
Teaching Scheme (Hours)	**:**	Lecture : 03 Hrs/week Tutorial : 00 Hrs/week			***Total Credits***	**:**	3
Evaluation Scheme (Marks)	**:**	CIE=30 (20+10)	SEE = 70	Grand Total=100	***Duration of SEE***	**:**	3 hrs
Revision:	**:**	Fourth			***Month***	**:**	June 2021
Pre-requisites *(if any)*	**:**	The prerequisite for this course is to possess the fundamental knowledge of Electronic measuring instruments, their principles etc.					
Course Domain	**:**	Core					

Course Rationale: This course will give fundamental knowledge of measurement system, transducers, bridges, oscilloscopes, display devices and data acquisition systems.

Course Objectives: The Course teacher will		***Course Outcomes:*** Students will be able to	
1	Acquire fundamental knowledge of measuring systems.	**1**	Define, describe the generalized measurement system and its elements
2	Study transducers.	**2**	Describe and sketch different transducers and explain their operation.
3	Study AC and DC bridges	**3**	Sketch, explain and design different dc and ac bridges.
4	Study oscilloscope and display devices	**4**	Sketch, explain and describe different oscilloscopes and display devices.
5	Study signal generators and analyzers	**5**	Sketch and describe signal generators and analyzers.
6	Study data acquisition systems.	**6**	Define, describe Data acquisition systems and conversion

Curriculum Content	**Hours**
Unit I Introduction to Measurements Systems and Measuring Instruments (6Hrs) Measurements, elements of generalized measurement system, measurement system performance, static and dynamic characteristic, Errors- Types & source of error. 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.	06
Unit II Transducers Definition, classification, transducer selection, different types of transducers, strain gauges, RTD, thermistor, thermocouple, LVDT, capacitive transducers, piezoelectric transducer, photovoltaic cell, LDR, Elastic pressure transducer – bellows, bourdon tubes, diaphragm, speed	06

measurement using magnetic and photoelectric pickup, ultrasonic transducers – level measurement	
Unit III AC and DC Bridges 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	06
Unit IV Oscillosope & Display Devices Introduction of Dual Beam and dual trace oscilloscope , Sampling, Digital storage, digital readout, measurement of phase and frequency using Lissajous pattern, CRO probes, Display devices: classification of display devices & principle: LED,LCD	06
Unit V Signal Generators and Analyzers Signal generators: Function generators, Sweep, pulse and square wave generator. Wave Analyzers: basic wave analyzer, heterodyne harmonic distortion analyzer, spectrum analyzer, logic analyser.	06
Unit VI Data Acquisition System and Conversion (6Hrs) Introduction,Objective of DAS, ,Single channel & Multichannel DAS ,DAC concepts: Binary weighted DAC, R-2R ladder circuit DAC, ADC concepts: flash, single slope, dual slope, stair case Ramp ADC, successive approximation ADC, Data Loggers	06

Suggested 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
Suggested Reference Books:	
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 PublicationPublishers.

Class, Part & Semester	**:**	**Second Year B. Tech (Electronics & Telecommunication Engineering) Part II, Semester IV**					
Course Title	**:**	**Data Structures**			***Course Code*:**	**:**	**ETE225**
Teaching Scheme (Hours)	**:**	Lecture : 04 Hrs/week Tutorial : 01 Hrs/week			***Total Credits***	**:**	04+01 = 05
Evaluation Scheme (Marks)	**:**	CIE=30 (20+10)	SEE = 70	Grand Total=100	***Duration of SEE***	**:**	3 hrs
Revision:	**:**	Fourth			***Month***	**:**	June 2021
Pre-requisites *(if any)*	**:**	Programming, Techniques **ETE215L**, Basics of computer fundamentals, C Programming					
Course Domain	**:**	Core					

Course Rationale: This course helps student in understanding logical & mathematical models of storing & organizing data in a particular way in a processor based system. In system programming, application programming the methods & techniques of data structures are widely used. The study of data structure helps the students in developing logical & structured programs.

Course Objectives: The Course teacher will		***Course Outcomes:*** Students will be able to	
1.	Inculcate fundamentals of data structures in students and to make their skills competent to industry.	**1.**	Articulate use of object-oriented features for data structures.
2.	Introduce the students to various searching and sorting algorithms using OOP language.	**2.**	Design basic data structures such as arrays, linked list.
3.	Generate awareness in students about various applications and use cases of data structures in industry.	**3.**	Perform various operations such as searching, insertion, deletion, traversing on different data structures
4.	Introduce techniques for efficient storage, manipulation and retrieval of data using data structures.	**4.**	Implement stack, queue using other data structures.
5.		**5.**	Understand concepts and types of non-linear like trees and graphs.
6.		**6.**	Implement various searching and sorting techniques.

Curriculum Content	**Hours**
Unit I: Introduction Types of Data Structure, Arrays, Strings, Recursion, ADT(Abstract Data type), Algorithms: complexity, time space trade-off with example	**06**
Unit II: Linked Lists Linked List as an ADT, Linked List Vs. Arrays, and Memory Allocation & De-allocation for a Linked List,	**08**

Linked List operations, Types of Linked List : Singly Linked List, Doubly Linked List, Circular Linked List, Implementation of Linked List, Applications of Linked List	
Unit III: Stack The Stack as an ADT, Stack operation, Array Representation of Stack, Link Representation of Stack, Applications of stack	**06**
Unit IV: Queue The Queue as an ADT, Queue operation, Array Representation of Queue, Linked list representation of Queue, Types of Queues : Circular Queue, Priority Queue, & Dequeue, Application of Queues	**06**
Unit V: Trees & Graphs Basic trees concept, Binary tree representation, Binary tree operation, Binary tree traversal, Binary search tree implementation, Threaded Binary tree. Basic concepts, Graph Representation, Graph traversal. Applications of trees & graphs	**08**
Unit VI: Algorithms Search : Linear Search, Binary Search *Sorting:* Sort Concept, Selection sort, Bubble sort, Insertion Sort, Merge Sort , Quick Sort	**08**
Suggested list of Tutorials and Assignments: **General Instructions: if any regarding course delivery and assessment**	

Suggested Text Books:	
1.	Horowitz Ellis, Sahani –‘ Fundamentals of Data Structures in C++’ -, Universities Press Publication
Suggested Reference Books:	
1.	Michael T Goodrich –‘ Data Structures and Algorithms in C++’ – 2nd Edition –Wiley Publication
2.	Mark Allen Weiss -‘ Data Structures and Algorithm Analysis in C++ ‘-3rd Edition - Pearson Publication
3.	J. R. Hubbard –‘ SCHAUM'S OUTLINE OF DATA STRUCTURES WITH C++ ‘–. 1st Edition – McGraw Hill Education

Class, Part & Semester	**:**	**S. Y. B.Tech (Electronics and Telecommunication Engineering) Part II, Semester IV**					
Course Title	**:**	**Industrial Organization and Management**			***Course Code*:**	**:**	**ETE 226**
Teaching Scheme (Hours)	**:**	Lecture : 03 Hrs/week Tutorial : -- Hrs/week			***Total Credits***	**:**	03
Evaluation Scheme (Marks)	**:**	CIE=30 (20+10)	SEE = 70	Grand Total=100	***Duration of SEE***	**:**	3 hrs
Revision:	**:**	Fourth			***Month***	**:**	June 2021
Pre-requisites	**:**	----					
Course Domain	**:**	Humanities and social science					

Course Rationale: *This course is emphasis on the industry / organization aspects such as Management, Administration, Ethical Practices required in industry and leadership qualities. Industry drives by people working in organization. Good engineer should have knowledge of industrial environment, how organization works, and importance of team work. This course gives you introductory information about all above issue which will help you in comfortable working at industry.*

Course Objectives: The Course teacher will		***Course Outcomes:*** Students will be able to	
1.	Introduces the basic concepts of management and organization structure of an industry.	**1.**	Explain the concepts of Management and organizational structure.
2.	Explore concept of Entrepreneurship.	**2.**	Discuss the values of human and industrial relation.
3.	Discuss Material management and cost analysis.	**3.**	Explain industrial environment.
4.	Introduce engineering economics and encourage for doing project management.	**4.**	Apply the project management tools effectively.
5.		**5.**	Use ethical and professional practices.
6.		**6.**	Demonstrate leadership quality.

Curriculum Content	**Hours**
Unit I Organization and Management Organization: Concept, Important, Characteristics, Elements, Structure and process of an industrial organization, Types of Organization, Functions of different departments. Relationship between individual departments. Management, Administration, Principals, process, functions and Characteristics of management, Objectives of management.	06
Unit II Human and Industrial Relations 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.	08

Unit III Industrial Psychology and Leadership Industrial Psychology and personal management, aim, objective and scope. Individual and group, difference in behavior, moral, Motivation: Factors determining motivation, Characteristics of motivation, Methods for improving motivation, Incentives, pay, promotion, rewards, Job satisfaction and job enrichment. Leadership: Need for leadership, Functions of a leader, Factors for accomplishing effective, leadership, Manager as a leader.	08
Unit IV Materials and Financial Management Material management, procurement, buying techniques, purchase procedure, accounting, physical verification. Financial Management: Types of capital, sources of capital, book keeping, assets, capital gearing, return of investment.	04
Unit V Professional ethics and environmental pollution Concept, ethics and moral, business and professional ethics, importance and need of ethics , ethical dilemmas, ethical problem in business. *Pollution:* ecology, factors causing pollutions, effect of pollution on wealth, air and water pollution and control, solid waste management, noise and control.	06
Unit VI Cost accounting and control Elements of cost, prime cost, overheads, factory and total cost. Selling price, nature and type of cost, process and production cost. Depreciation, breakeven analysis and chart.	04

Assignments: Based on the following activity

- The Assignment work includes six assignments based on theory curriculum
  and
- The tutorial work is also consisting of the industrial survey and report writing. Students have to follow the guidelines given below. Evaluation of the students will be done on completion of the report and presentation.
  1. Form the group of students not exceeds than five.
  2. Select the appropriate product or service based industry in the nearby region.
  3. Take permission of industry for the visit.
  4. Visit the industry and make the survey with respect to organization structure, various departments and their functions, processing of raw material to form final product, administration, vision, mission, goals, growth etc.
  5. Go for multiple visits if required.
  6. Prepare the Industrial Survey report in detail and submit at the end of semester.
  7. Prepare and make presentation on the industrial survey.

Suggested Text Books:

1.	OP Khanna, 'Industrial Engineering and Management', Dhanpat Rai Publications, Delhi.
2.	

Suggested Reference Books:

1.	T R Banga, 'Industrial Engineering and Management', TMH Publications
2.	J. Michael. Jacob ―Application & Design with Analog Integrated Circuits, PHI.

Class, Part & Semester	**:**	**Second Year B. Tech (Electronics & Telecommunication Engineering), Part II, IV**					
Course Title	**:**	**Electronics Circuit Design- II Laboratory**			***Course Code*:**	**:**	ETE221L
Teaching Scheme (Hours)	**:**	Practical :	02 Hrs/week		***Total Credits***	**:**	01
Evaluation Scheme (Marks)	**:**	IPE/IOE=	EPE=50	Total=50	***Duration of EPE***	**:**	03 Hrs
Revision:	**:**	Fourth			***Month***	**:**	June 2021
Pre-requisites *(if any)*	**:**	BS-11A1, ES-11A3, ES-11A6, ES-12A3					
Course Domain	**:**	Core					

Course Rationale: This course deals with design and implementation aspects of primitive power supply and amplifier circuits.

Course Objectives: The Course teacher will		***Course Outcomes:*** Students will be able to	
1.	Illustrate the wave shaping circuit design	**1.**	Analyze and design the passive wave shaping circuits
2.	Illustrate working principle of multivibrators	**2.**	Analyze and design transistorized square and rectangular wave generator circuits
3.	Illustrate the design of oscillators	**3.**	Analyze and design transistorized sine wave generator circuits
4.	Discuss the power amplifier circuits	**4.**	Analyze and design power amplifier circuits
5	Discuss the working principle of FETs	**5.**	Understand construction and working principle of JFETs and MOSFETs
6	Discuss the working principles of communication amplifier circuits.	**6**	Describe the working principle of tuned amplifier

List of Experiments

Sr. No.	Minimum 8 experiments should be conducted from the list given below
1.	Study of RC low pass filter as an integrator
2.	Study of frequency response of low pass filter
3.	Study of RC high pass filter as a differentiator
4.	Study of frequency response of high pass filter
5.	Design of different clipper circuits

6.	Study of different clamper circuits: positive, negative & bias
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 and design of power amplifiers
16.	Study of characteristics of JFET and MOSFET

General Instructions: Any 8 experiments should be conducted in laboratory, out of 8 experiments 2 experiments must be based on any simulation tool.

Suggested Text Books/ Reference Books/Manual

1.	J. B. Gupta, 'Electronics Devices and Circuits' , Katson Books
2.	Robert L. Boylsted, Louis Nashelsky- 'Electronic devices & circuit theory'- 9th edition- Pearson Education
3.	David A. Bell –'Electronic devices & circuits'- 4th Edition- Prentice- Hall India
4.	Manufacturer data sheets

Class, Part & Semester	:	**Second Year B. Tech (Electronics & Telecommunication Engineering), Part II, Semester IV**					
Course Title	:	**Analog Communication Laboratory**			***Course Code*:**	:	ETE222L
Teaching Scheme (Hours)	:	Practical :	02 Hrs/week		***Total Credits***	:	01
Evaluation Scheme (Marks)	:	IPE/IOE=Nil	EPE =50	Total=50	***Duration of EPE***	:	03hrs
Revision:	:	Fourth			***Month***	:	June 2021
Pre-requisites *(if any)*	:	ETE211-Engineering Mathematics-III, ETE212 Electronics Circuit Design –I					
Course Domain	:	core					

Course Rationale: Familiarize the students with basic analog communication systems. Integrate theory with practical so that the students appreciate the knowledge gained from the theory course about amplitude, frequency, pulse transmission and reception.

Course Objectives: The Course teacher will		***Course Outcomes:*** Students will be able to	
1.	To introduce and analyze techniques of generation, transmission and reception of amplitude modulation (AM) frequency modulation (FM) and phase modulation (PM) signals	**1.**	Understand the basic concepts, components of the analog communication system and effect of noise on it
2.	To introduce the pulse modulation and demodulation techniques.	**2.**	Analyze and compute modulation index, bandwidth and power requirements of amplitude modulation.
3.	To understand and analyze impact of noise on communication system	**3.**	Analyze and compute modulation index, bandwidth and power requirements of angle modulation such as FM & PM
4.	Analyze various communication receivers	**4.**	Analyze various analog pulse modulation and demodulation techniques.
		5.	Understand operation of AM receivers
		6.	Understand operation of FM receivers

List of Experiments	
Sr. No.	Name of Experiment
1.	Study of Amplitude Modulation (A.M.)
2.	Study of Frequency Modulation.(F.M.)
3.	Study of AM Detection.
4.	Study of SSB Modulation & Demodulation.
5.	Study of DSB Modulation & Demodulation.
6.	Study of FM Demodulation.
7.	Sampling and Reconstruction.
8.	Study of Pulse Amplitude Modulation & Demodulation.
9.	Study of Pulse Width Modulation& Demodulation.
10.	Study of Pulse Position Modulation & Demodulation.
11.	Study of PAM-TDM.
12.	Study of AM Receiver Characteristics.(Sensitivity, Selectivity & Fidelity)
13.	Visit to radio station (AM/FM).

General Instructions: Institute's Laboratory Course Manual and equipment wise Standard Operating Procedure to follow.

Suggested Text Books/ Reference Books/Manual	
1.	George Kennedy, 'Electronics Communication System'--Tata McGraw Hill Publication.
2.	Wayne Tomasi, 'Electronics Communication Systems Fundamentals through Advanced' - Pearson Education.
3.	Louis E. Frenzel, 'Principles of Electronic Communication Systems' -Tata McGraw Hill Publication.
4.	Dennis Roddy, John Coolen, 'Electronics Communications '4th Edition-Pearson Education

Class, Part & Semester	:	**S. Y. B.Tech (Electronics and Communication Technology) Part II, Semester IV**					
Course Title	:	**Linear Integrated Circuits Laboratory**			***Course Code*:**	:	**ETE 223L**
Teaching Scheme (Hours)	:	Practical :	02 Hrs/week		***Total Credits***	:	01
Evaluation Scheme (Marks)	:	IPE/IOE=NA	EPE = 50	Total= 50	***Duration of EPE***	:	3 Hours
Revision:	:	Fourth			***Month***	:	June 2021
Pre-requisites *(if any)*	:	NA					
Course Domain	:	Program Core					

Course Rationale:

Analog Circuits plays a vital role in the design of an electronic system. This course is detail study of important Analog / Linear Integrated Circuits (ICs). This course is a Circuit Design course planned to give exposure on use of operational amplifier (Op. Amp.) For Different applications and its significance in real world. It also includes other Analog ICs like Timer IC 555 and PLL.

Course Objectives: The Course teacher will		***Course Outcomes:*** Students will be able to	
1	Impart information about OPAMP 741 internal circuit and characteristics.	**1**	Analyze the internal circuits of op. amp. 741.
2	Explore OPAMP parameters	**2**	Analyze different op. amp. Parameters.
3	Explore OPAMP frequency response	**3**	Describe the open loop and closed loop frequency response of op. amp.
4	Discuss OPAMP linear and nonlinear applications	**4**	Analyze linear and non-linear applications of op. amp.
5	Discuss OPAMP based filters and signal generator	**5**	Design Filter and Signal generator circuits using op. amp.
6	Explore linear IC PLL and Timer 555	**6**	Describe the PLL and Timer IC with application circuits.

List of Experiments

1.	Study of Inverting amplifier for DC & AC inputs using opamp
2.	Study of Non-Inverting amplifier for DC & AC inputs using opamp
3.	Frequency Response of Inverting & Non-Inverting amplifier using opamp
4.	Study of op-amp as Summing, Scaling, & Averaging amplifier in Inverting & Non-Inverting.
5.	Study of Instrumentation Amplifier using LM 324
6.	Study of V-I & I-V Converter

7.	Study of Schmitt Trigger using opamp & Window detector using opamp
8.	Study of Comparator & Zero Crossing Detector using opamp
9.	Study of Precision Rectifier using opamp
10.	Study of Butterworth Filter using opamp
11.	Study of Triangular & square wave generator using opamp
12.	Design of IC 555 Timer as Astable & Monostable Multivibrator
13.	Study of IC NE 565 PLL
14.	Study of Weins Bridge Oscillator using opamp
15.	Study of Function Generator using IC 8038.

General Instructions:

- Above stated experiments will be conducted on Bread Board.
- Few experiments can be done using any simulation tool.
- For More details of experiments student can refer to Laboratory Manual.

Suggested Text Books/ Reference Books/Manual

1.	Ramakant. A.Gayakwad ― Op-Amps & Linear Integrated Circuits, 3rd Edition, PHI.
2.	S.Salivahanan & Bhaaskaran ―Linear Integrated Circuits, 1st Edition, Tata McGraw Hill

Class, Part & Semester	:	**Second Year B. Tech (Electronics & Telecommunication Engineering), Part II, IV**					
Course Title	:	**Measurements and Instrumentation Lab**			***Course Code*:**	:	ETE224L
Teaching Scheme (Hours)	:	Practical :	02 Hrs/week		***Total Credits***	:	01
Evaluation Scheme (Marks)	:	IPE/IOE= 50	EPE/EOE=Nil	Total=50	***Duration of EPE***	:	Nil
Revision:	:	Fourth			***Month***	:	June 2021
Pre-requisites *(if any)*	:	The prerequisite for this course is to possess the fundamental knowledge of Electronic measuring instruments, their principles etc.					
Course Domain	:	Core					

Course Rationale: The course is to acquaint the students with practical knowledge of the basic concepts of electronic circuits, energy sources, circuit transformations, two-port networks, design of filters and attenuators. The students will be able to understand circuit fundamentals and its analysis **.**

Course Objectives: The Course teacher will		***Course Outcomes:*** Students will be able to	
1.	Acquire fundamental knowledge of measuring systems.	**1.**	Define, describe the generalized measurement system and its elements
2.	Study different types of transducers.	**2.**	Describe and sketch, and use different types of transducers and explain their operation.
3.	Study different types of AC and DC bridges	**3.**	Sketch, explain and design different dc and ac bridges.
4.	Study oscilloscopes and display devices	**4.**	Sketch, explain and use different oscilloscopes and display devices.

List of Pricticals

Sr. No.	Title of Experiments
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 bourdon tube
10.	Study of DAC using R-2R ladder network
Suggested Text Books/ Reference Books/Manual	
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
3.	A.K.Sawhney 'A Course in Electrical & Electronics Measurement & Instrumentation.' –11th Edition, 1996 --Dhanpat Rai & sons
4.	C.S. Rangan ,G.R. Sharma , V.S.V. Mani 'Instrumentation devices and system' 2nd edition -- Tata McGraw Hill Publication

Class, Part & Semester	:	**Second Year B. Tech (Electronics & Telecommunication Engineering) Part II, Semester IV**					
Course Title	:	**Data Structures Tutorial**			***Course Code*:**	:	**ETE225L**
Teaching Scheme (Hours)	:	**Tutorials** :	01 Hrs/week		***Total Credits***	:	01
Evaluation Scheme (Marks)	:	IPE/IOE=	EPE/EOE=	Total=	***Duration of EPE***	:	----
Revision:	:	Fourth (For Mech & Civil Engg, I guess it is the second revision. Please check)			***Month***	:	June 2021
Pre-requisites *(if any)*	:	Programming, Techniques **ETE215L**, Basics of computer fundamentals, C Programming					
Course Domain	:	core					

Course Rationale: This course helps student in understanding logical & mathematical models of storing & organizing data in a particular way in a processor based system. In system programming, application programming the methods & techniques of data structures are widely used. The study of data structure helps the students in developing logical & structured programs.

Course Objectives: The Course teacher will		***Course Outcomes:*** Students will be able to	
1.	Inculcate fundamentals of data structures in students and to make their skills competent to industry.	**1.**	Articulate use of object-oriented features for data structures.
2.	Introduce the students to various searching and sorting algorithms using OOP language.	**2.**	Design basic data structures such as arrays, linked list.
3.	Generate awareness in students about various applications and use cases of data structures in industry.	**3.**	Perform various operations such as searching, insertion, deletion, traversing on different data structures
4.	Introduce techniques for efficient storage, manipulation and retrieval of data using data structures.	**4.**	Implement stack, queue using other data structures.
		5.	Understand concepts and types of non-linear like trees and graphs.
		6.	Implement various searching and sorting techniques.

List of Experiments

Sr. No.	
1.	Array operations

2.	Singly linked list operations
3.	Doubly linked list operations
4.	Singly circular linked list operations
5.	Doubly circular linked list operations
6.	Stack using arrays
7.	Queue using arrays
8.	Implement Linear and binary search
9.	Implement selection sort and bubble sort
10.	Insertion sort
11.	Merge sort
General Instructions: Large number of programs should be covered.	
Suggested Text Books/ Reference Books/Manual	
1.	Horowitz Ellis, Sahani –' Fundamentals of Data Structures in C++' -, Universities Press Publication
2.	Michael T Goodrich –' Data Structures and Algorithms in C++' – 2nd Edition –Wiley Publication
3.	Mark Allen Weiss -' Data Structures and Algorithm Analysis in C++ '-3rd Edition - Pearson Publication
4.	J. R. Hubbard –' SCHAUM'S OUTLINE OF DATA STRUCTURES WITH C++ '–. 1st Edition – McGraw Hill Education

Class, Part & Semester	:	**S. Y. B.Tech (Electronics and Communication Technology) Part II, Semester IV**					
Course Title	:	**Environmental Studies project work**			***Course Code***	:	ES218
Teaching Scheme (Hours)	:	Lecture : 02 Hour/Week Tutorial : 00 Hours/Week			***Total Credits***	:	Nil
Evaluation Scheme (Marks)	:	CIE = 00 SEE = 70	IPE=30 Project	: Grand Total=100	***Duration of SEE***	:	3 hrs. At the year end
Revision	:	Fourth			***Month***	:	June 2021
Pre-requisites *(if any)*	:	ES218					
Course Domain	:	Environmental studies					

Course Rationale: The Course is all about learning the way we should live and how we can develop sustainable strategies to protect the environment. It helps individuals to develop an understanding of living and physical environment and how to resolve challenging environmental issues affecting nature.

Course Objectives: The Course Teacher will		***Course Outcomes:*** Students will be able to	
1.	Explain the types of environmental pollution.	1.	Identify the pollutants and respond to the pollution problem
2	Make the students recognize social issues and the environment connectivity with the same.	2.	Acquire knowledge of ecological threats and choose for sustainable developments.
3.	Discuss various environmental Protection Acts reveal the students the importance of the same.	3.	Anticipate all these laws and follow the same for the care of the environment.
4.	Explain the students to adapt to various environmental technologies.	4.	Apply their knowledge to implement pollution prevention measure through some practical work.

Curriculum Content	**Hours**
Unit V Environmental pollution: 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	06
Unit VI Social issues and the environment : 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.	08
Unit VII Environmental protection : 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. ;Field Work-Visit to a local area to document environmental assets river/forest/grassland/hill/mountain or Visit to a local polluted site urban/rural/Industrial/Agricultural or Study of common plants,	06

insects, birds or Study of simple ecosystems-ponds, river, hill slopes, etc.	
Unit VIII Project / Field work:	10

Suggested Text Books:

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

Suggested Reference Books:

1.	Clark R. S., Marine Pollution, Clanderson Press Oxford (TB) Pg No. 6
2.	Cunningham, W. P. Cooper, T. H. Gorhani, E. & Hepworth, M. T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p
3.	De A. K., Environmental Chemistry, Wiley Eastern Ltd.
4.	Down to Earth, Centre for Science and Environment (R)
5.	Gleick, H., 1993, Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute. Oxford Univ. Press 473p
6.	Hawkins R. e., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
7.	Heywood, V. H. & Watson, R. T. 1995, Global Biodiversity Assessment, Cambridge Univ. Press 1140p.
8.	Jadhav, H. & Bhosale, V. M. 1995, Environmental Protection and Laws, Himalaya Pub. House, Delhi, 284p.
9.	Mckinney, M. L. & Schocl. R. M. 1996, Environmental Science Systems & Solutions, Web enhanced edition
10.	Mhskar A. K., Matter Hazardous, Techno-Science Publications (TB)
11.	Miller T. G. Jr., Environmental Science, Wadsworth Publishing Co. (TB)
12.	Odum, E. P. 1971, Fundamentals of Ecology, W. B. Saunders Co. USA, 574p.
13.	Rao M. N. & Datta, A. K. 1987, Waste Water Treatment, Oxford & IBH Publ. Co. Pvt. Ltd.,
14.	Sharma B. K., 2001, Environmental Chemistry, Goel Publ. House, Meerut
15.	Survey of the Environment, The Hindu (M)
16.	Townsend C., Harper, J. and Michael Begon, Essentials of Ecology, Blackwell Science (TB)
17.	Trivedi R. K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media (R)
18.	Trivedi R. K. and P. K. Goel, Introduction to air pollution Techno-Science Publications (TB)
19.	Wagner K. D., 1998, Environmental Management, W. B. Saunders Co. Philadelphia, USA.

Class, Part & Semester	:	**S. Y. B.Tech (Electronics and Communication Technology) Part II, Semester IV**								
Course Title	:	**Soft Skills Development**						***Course Code***	:	EC 227
Teaching Scheme (Hours)	:	2 Hours /Week= 2 x13= 26 hours						***Total Credits***	:	Nil
Evaluation Scheme (Marks)	:	Assignments Viva voce	: :	50 25	Written Test Grand Total	: :	25 100	***Duration of SEE***	:	NA
Revision	:	Fourth						***Month***	:	June 2021
Pre-requisites *(if any)*	:	H. S. C. Level English language competency								
Course Domain	:	Humanity and Arts								

Course Rationale: The course skills focus on who people are, as opposed to what they are trained in. These skills serve to represent learners' approach to life and work. The course develops interpersonal skills hardwired to an individual's personality, and such skills characterize how we interact with other people in the workplace. These skills are important because they enable students to adjust to the frustrations and challenges they will encounter in their adult life, as well as the demands of work. Mastering soft skills help students learn, live and work better.

Course Assessment Method: The students will be given five assignments each for 10 marks. At the end of the course, there will be a written test of 25 marks and a viva voce of 25 marks. All these assessments will be for a total of 100 marks. Based on the marks obtained, they will be awarded with a grade similar to other credit courses. Though it is an audit course, obtaining passing grade is essential.

Course Objectives: The Course Teacher will		***Course Outcomes:*** Students will be able to	
1.	Illustrate the components of self-development and state the importance of career planning.	**1.**	Identify components of self-development and realize its importance in their career planning.
2.	Define Communication and classify the same.	**2.**	Differentiate between different communication types and apply the same.
3.	Explain behavioral skills, team skills and interpersonal skills.	**3.**	Acquire behavioral, team and interpersonal skills and display the same.
4.	Classify documentation types and describe various types of report writing.	**4.**	Follow different document formats and acquire report and proposal writing skills.
5.	Describe emotional intelligence and its role.	**5.**	Receive and respond to emotions with intelligence.
6.	Paraphrase interview skills and demonstrate resume writing.	**6.**	Acquire interview skills and apply those when required.

Curriculum Content	**Hours**
Unit I Self Development: Self-analysis, creativity, attitude, motivation, goal setting. Importance of career visioning and planning.	02
Unit II Effective Communication Skills: Importance of communication, Communication process, Elements of communication, Communication Types-verbal and non-verbal, objectives of communication. Business Communication, current English usage, debates, language games,	06

situational dialogues, precise writing, essay writing, presentations.	
Unit III Behavioral Skills: Psychological Tests: Aptitude and personality assessment, suggestions for improvement, **Team Skills:** Team building and leadership, evolution of groups into teams, group dynamics, emergence of leadership, intra-group dynamics, inter-group dynamics, conflict management, inter dependency, assessment of team-based projects, **Time Management:** Pareto's Principle, Parkinson's Laws, Murphy's Laws, Law of Clutter, prioritization, goal setting, effective time management, **Interpersonal Skills:** Negotiations, listening skills, social skills, assertive skills, cross-cultural communications, **Leadership Skills:** Concepts of leadership, leadership styles, insights from great leaders.	08
Unit IV Documentation: Report writing-Formal report, study tour report, project report, Writing proposal-solicited proposals and unsolicited proposals.	03
Unit V Emotional Intelligence: Emotional Brain, Nature of emotional intelligence, emotional intelligence applied windows of opportunity, emotional literacy.	04
Unit VI Interview Skills: Importance of Interview Skills, Resume Building, Group discussion and personal interview, Psychometric Test, actual career planning.	03

Suggested Text Books:

1.	Soft Skills, 2015, Career Development Centre, Green Pearl Publications.

Suggested Reference Books:

1.	Seven Habits of Highly Effective Teens, Covey Sean, New York, Fireside Publishers, 1998.
2.	How to win Friends and Influence People, Carnegie Dale, New York: Simon & Schuster, 1998.
3.	I am ok, You are ok ,Thomas A Harris, New York-Harper and Row, 1972
4.	Emotional Intelligence, Daniel Goleman, Bantam Book, 2006
5.	Effective communication skill, MTD training & Ventus publishing ApS ISBN 978-87-7681-598-1.