JAIDEV EDUCATION SOCIETY'S

J D COLLEGE OF ENGINEERING AND MANAGEMENT

KATOL ROAD, NAGPUR

Website: www.jdcoem.ac.in E-mail: info@jdcoem.ac.in **An**

Autonomous Institute, with NAAC "A" Grade Affiliated to

DBATU, RTMNU & MSBTE Mumbai

Department of Electronics and Telecommunication Engineering

"Rectifying Ideas, Amplifying Knowledge"

VISION	MISSION
"To be a Department providing high quality & globally competent knowledge of concurrent technologies in the field of Electronics and Telecommunication."	1. To provide quality teaching learning process through well-developed educational environment and dedicated faculties.
	2. To produce competent technocrats of high standards satisfying the needs of all stakeholders.

Scheme for B. Tech in Electronics and Telecommunication Engineering (w.e.f. 2024-25)

B. Tech Third Semester

Sr. No.	Category of Course	Course Code	Course Name	Teaching Scheme			Evaluation Scheme				Credits
				L	T	P	CA	MSE	ESE	Total	
1	PCC	ET3T001	Electronic Devices and Circuits	3	0	0	20	20	60	100	3
2	PCC	ET3T002	Analog Circuits	3	0	0	20	20	60	100	3
3	PCC	ET3T003	Digital SystemDesign	2	0	0	20	20	60	100	2
4	MDM	ET3M001	Machine Learning & Algorithms	2	0	0	20	20	60	100	2
5	OE	ET3O001	Open Elective -I	3	0	0	20	20	60	100	3
6	EEMC	ET3H001	EntrepreneurshipDevelopment	2	0	0	20	20	60	100	2
7	VEC	ET3V001	Universal HumanValues- II	2	0	0	20	20	60	100	2
8	PCC	ET3L005	Electronic Devices and Circuits Lab	0	0	2	60	0	40	100	1
9	PCC	ET3L006	Analog Circuits Lab	0	0	2	60	0	40	100	1
10	PCC	ET3L007	Digital SystemDesign Lab	0	0	2	60	0	40	100	1
11	CEP/FP	ET3F001	Community Engineering Project (CEP)	0	0	4	60	0	40	100	2
			Total	**17**	**0**	**10**	**380**	**140**	**580**	**1100**	**22**

Secretary
BoS ETC Board

Chairman
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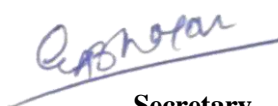*"Rectifying Ideas, Amplifying Knowledge"*
Session: **2024-25**

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Scheme for B. Tech in Electronics and Telecommunication Engineering

B. Tech Fourth Semester

Sr. No.	Category of Course	Course Code	Course Name	Teaching Scheme			Evaluation Scheme				Credits
				L	T	P	CA	MSE	ESE	Total	
1	PCC	ET4T001	Signals and Systems	2	0	0	20	20	60	100	2
2	PCC	ET4T002	Analog & Digital Communication System	3	0	0	20	20	60	100	3
3	MDM	ET4M002	Soft Computing	2	0	0	20	20	60	100	2
4	OE	ET4O002	Open Elective -II	2	0	0	20	20	60	100	3
5	AEC	ET4A001	Principles of Corporate Success	2	0	0	20	20	60	100	2
6	EEMC	ET4H002	Engineering Economics	2	0	0	20	20	60	100	2
7	VEC	ET4V002	Intellectual Property Rights	2	0	0	20	20	60	100	2
8	PCC	ET4L003	Python Programming Lab	0	0	2	60	0	40	100	1
9	PCC	ET4L004	Analog & Digital Communication System Lab	0	0	2	60	0	40	100	1
10	VSEC	ET4L005	Drone Technology	0	0	4	60	0	40	100	2
11			MOOC Course (NPTEL)				40	0	60	100	2
			Total	**15**	**0**	**8**	**360**	**140**	**600**	**1100**	**22**

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Program: B.Tech in Electronics and Telecommunication Engineering

Semester	Course Code	Name of the course	L	T	P	Credits
III	ET3L005	Electronics Devices and Circuit Lab	0	0	2	1

Prerequisites for the course	
1	Basic knowledge of Electronic Devices·

Prior Reading Material/ useful links	
1	https://onionesquereality.wordpress.com/.../more-video-lectures-tit-open
2	http://www.electronics-tutorials.as/transistor/tran1.html
3	http://was.allaboiitcircuits.com/textbook/semiconductors/chpt-I/active-versus-passivedevices/

Course Objectives:

Sr. No	Course Objectives
1	To identify Basic electronic components and devices.
2	To observe the characteristics of MOSFET, CMOS Inverter, UJT.
3	To impart different amplifier configurations and their Frequency response.
4	To design and Simulate Electronic circuits.

Course Outcomes: At the end of the course students will be able to:

Course outcome number	CO statement
CO1	**Identify** Basic electronic components and devices
CO2	**Observe** the characteristics of MOSFET, CMOS, FET, UJT
CO3	**Analyze** different amplifier configurations and their Frequency response
CO4	**Design** and Simulate Electronic circuits

	List of Practicals
Expt.1	To calculate ripple factor of full wave rectifier with and without filter.
Expt.2	To plot the characteristics of clipper circuit & to perform simulation on Multisim
Expt.3	To plot the characteristics of clamper circuit & to perform simulation on Multisim.
Expt.4	To design Zener Diode as a Voltage Regulator & to perform simulation on Multisim.
Expt.5	To design a transistor shunt voltage regulator on Multisim.
Expt.6	To design emitter follower type of voltage regulator using darlington pair and simulate it on Multisim
Expt.7	To design pushpull class A power amplifier and simulate it on Multisim
Expt.8	To design class AB audio power amplifier and simulate it on Multisim
Expt.9	To design Hartley oscillator and simulate it on Multisim.
Expt.10	To design a Wein Bridge Oscillator and simulate it on Multisim.
Expt.11	To design RC Phase Shift Oscillator and simulate it on Multisim.
Expt.12	To plot the drain & transfer characteristics of FET in CS mode & to perform simulation on Multisim.
Expt.13	To verify frequency response of single stage RC coupled amplifier & to perform simulation on Multisim.
Expt.14	To design a CMOS inverter using microwind.
Expt.15	To design a CMOS inverter using microwind.
Expt.16	Open Ended experiments.

	Text Books
1	Neil Weste and David Harris, Addison-Wesley "CMOS VLSI Design — A Circuits and Systems Perspective", Fourth edition, Pearson
2	Donald Neaman, "Electronic Circuit Analysis and Design", Third Edition, Tata McGraw Hill
3	Millnian, Halkias, "Integrated Electronics- Analog and Digital Circuits and Systems",Second Edition , Tata McGraw Hill

	Reference Books
1	Brijeshlyer, S. L. Nalbalwar, R. Dudhe, "Electronics Devices & Circuits", Synergy Knowledgeware Mumbai, 2017. 1SBN:9789383352616.
2	David A. Bell, "Electronic Devices and Circuits", Fourth Edition, PH1.
3	Floyd, "Electronic Devices", Seventh Edition, Pearson.
4	Sedra and Smith, "Microelectronic Circuits", Oxford University Press, 2004.

	Useful links
1	https://npte1.ac.in/content/storage2/courses/117101058/downloads/
2	http://www.nesoacademy.org/electronics-engineering/analog-electronics/analog

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Semester	Course Code	Name of the course	L	T	P	Credits
III	ET3T002	Analog Circuits	3	-	-	3

	Prerequisites for the course
1	Basic knowledge of electronic active and passive components.
2	Basic knowledge of Circuit theory

	Prior Reading Material/useful links
1	https://semiengineering.com/knowledge_centers/integrated-circuit/ic-types/analog-circuits/
2	https://www.youtube.com/watch?v=kOckxSxf6XQ
3	https://onlinecourses.nptel.ac.in/noc22_ee15/preview

Course Objectives:

Sr.No	Course Objectives
1	To introduce the basic building blocks of linear integrated circuits.
2	To make students understand the linear and non - linear applications of operational amplifiers.
3	To design circuits and systems for particular applications using linear integrated circuits.

Course Outcomes: At the end of the course the student will be able to:

Sr.No	Course outcome number	CO statement
1	CO1	Understand the basic concepts of OPAMP.
2	CO2	Apply knowledge of differential amplifiers, current sources in analyzing the basic building blocks of operational amplifier.
3	CO3	Analyze different analog circuits and evaluate its performance parameter.
4	CO4	Generate signals using OP – AMP Circuits.
5	CO5	Design circuits using operational amplifiers for various applications.

Syllabus:

Course Contents	
Unit I	**Introduction to Operational Amplifiers –** Introduction, Block diagram representation of a typical Op-amp, schematic symbol, characteristics of an Op-amp, ideal op-amp, equivalent circuit, ideal voltage transfer curve, open loop configuration, differential amplifier, inverting & non –inverting amplifier, Concept of feedback & their types. **[8 Hrs]**
Unit II	**Linear Applications of Op-amp** Voltage follower, Summing amplifier, scaling and averaging amplifier, Instrumentation amplifier and applications, Integrator and differentiators, current to voltage converters, voltage to current converters, Peak detector, Log and antilog amplifiers, analog multipliers. **[8 Hrs]**
Unit III	**Non-Linear Applications of Op-amp** Comparators, Schmitt trigger, Clipper and Clamper, Precision Rectifier. Multivibrators: Bistable, Monostable, Astable multivibrator circuits using Op-Amp, Sample/Hold circuits. **[7 Hrs]**
Unit IV	**Signal Generators** Principle of Oscillators, Barkhausen's criterion, Oscillator types and Principle of operation, analysis and derivation of frequency of oscillation of: RC, LC oscillators,Triangular wave generator, Saw tooth wave generators. Timer IC 555, IC Voltage regulators – Three terminal fixed and adjustable voltage regulator, Phase Locked Loops, Operating principles, Monolithic PLLs **[8 Hrs]**
Unit V	**Data Converters and Filters** D/A conversion fundamentals (Weighted resistor summing D/A Converter, R-2R Ladder D/A converter), A/D conversion (Ramp converters, Successive Approximation A/D converters, Dual slope converters, Parallel A/D converters. Tracking A/D converters) First and second order Low Pass filter, High Pass filter, Band Pass filter, All pass active filters. **[9 Hrs]**
Text Books	
1	Linear Integrated Circuits, D. Roy Choudhury and Shail B. Jain, 4th edition, Reprint 2006, New Age International
2	Op-Amps and Linear Integrated Circuits, Ramakant A Gayakwad , Pearson, 4th Ed, 2015.
Reference Books	
1	Operational Amplifiers & Linear Integrated Circuits –Sanjay Sharma ;SK Kataria &Sons;2nd Edition,2010
2	OP AMPS and Linear Integrated Circuits concepts and Applications, James M Fiore, Cenage Learning India Ltd
3	Operational Amplifiers & Linear Integrated Circuits–R.F.Coughlin & Fredrick Driscoll, PHI, 6th Edition
4	Operational Amplifiers & Linear ICs – David A Bell, Oxford Uni. Press, 3rd Edition, 2005
Useful links	
1	https://youtu.be/311XkpNGs8c
2	http://kabuki.eecs.berkeley.edu/~keitho/ic771ca/
3	http://www.deas.harvard.edu/courses/es154/

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Semester	Course Code	Name of the course	L	T	P	Credits
III	ET3T003	Digital System Design	2	0	0	2

Prerequisites for the course	
1	Basic Circuit Analysis and Design
2	Basic Electronics Engineering

Prior Reading Material/useful links	
1	https://bmsit.ac.in/public/assets/pdf/ece/studymaterial/18EC34%20-%20Hamsavahini%20R.pdf
2	https://www.intechopen.com/chapters/76484

Course Objectives:

Sr. No	Course Objectives
1	To impart fundamentals of digital system design
2	To study system modelling using VHDL.
3	To study CPLD and FPGA Architecture.

Course Outcomes:

Sr. No	Course outcome number	CO statement
1	CO1	**Understand** the fundamentals of Hardware description Language.
2	CO2	**Model** digital systems using VHDL and demonstrate it using a front end tool.
3	CO3	**Analyze** delays introduced in any model to investigate technical issues in digital system
4	CO4	**Design** and Build combinational and sequential digital circuits.

Syllabus:

Course Contents	
Unit I	**Introduction:** Introduction to VHDL, Methodologies, design Units, data objects, VHDL data types, Attributes. **[4 Hrs]**
Unit II	**VHDL Statements and concept of delays** Concurrent and sequential statements, inertial and transport delays, delta delay, signal drivers. **[5 Hrs]**
Unit III	**Programming concepts:** Subprograms – Functions, Procedures, generic, generate, package, IEEE standard logic ibrary, file I/O, test bench, component declaration, instantiation, configuration. **[7Hrs)**
Unit IV	**Combinational System Design:** Combinational logic circuit design and VHDL implementation of following circuits – fast adder, Subtractor, decoder, encoder, multiplexer, ALU, barrel shifter, 4X4 keyboard encoder, multiplier, divider. **Sequential System Design:** Synchronous sequential circuits design – finite state machines, Mealy and Moore, state assignments, design and VHDL implementation of FSMs, Linear feedback shift register. **[10 Hs]**
Unit V	**Introduction to PLDS:** Introduction to place & route process, Introduction to ROM, PLA, PAL, Architecture of FPGA(Xilinx / Altera). Advanced trends in digital system design. **[6 Hrs]**

Text Books	
1	Stephen Brown, Zvonko Vranesic, "Fundamentals of Digital Logic with VHDL design", 4th Edition, TMH, 2006.
2	S.S. Limaye, "VHDL A Design Oriented Approach", 4th Edition, The McGraw Hill, 2009.
3	Manjita Shrivastava, "Digital Design HDL-based approach", 2nd Edition, Cenage Learning, 2011.

Reference Books	
1	J Bhasker, "VHDL Primer", 3rd Edition, Pearson Education, 2007.
2	Douglas Perry, " VHDL: Programming by Example", 3rd Edition, TMH, 2008.
3	Zainalabedin Navabbi, **"VHDL:Modular Design and Synthesis of Cores and Systems"**, 3rd Edition,MC graw Hill,2007.

Useful links	
1	https://www.tutorialsduniya.com/notes/digital-systems-applications-notes/
2	https://mrcet.com/downloads/digital_notes/IT/DIGITAL%20LOGIC%20DESIGN%20(R17A0461).pdf
3	https://bmsit.ac.in/public/assets/pdf/ece/studymaterial/18EC34%20-%20Hamsavahini%20R.pdf

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Semester	Course Code	Name of the course	L	T	P	Credits
III	ET3M001	Machine Learning & Algorithms	2	-	-	2

Prerequisites for the course	
1	You must be comfortable with variables, linear equations, graphs of functions, histograms, and statistical means.
2	You should be a good programmer. Ideally, you should have some experience programming in Python because the programming exercises are in Python.
3	However, experienced programmers without Python experience can usually complete the programming exercises anyway.

Prior Reading Material/useful links	
1	https://www.geeksforgeeks.org/machine-learning/
2	Understanding Machine Learning: From Theory to Algorithms, ByShai Shalev- Shwartz and Shai Ben-David URL: https://www.cs.huji.ac.il/~shais/UnderstandingMachineLearning/index.html
3	Bayesian Reasoning and Machine Learning By David Barber URL: http://web4.cs.ucl.ac.uk/staff/D.Barber/textbook/091117.pdf

Course Objectives:

Sr.No	Course Objectives
1	To understand the basic theory underlying machine learning.
2	To be able to formulate machine learning problems corresponding to different applications.
3	To understand a range of machine learning algorithms along with their strengths and weaknesses.
4	To be able to apply machine learning algorithms to solve problems of moderate complexity.
5	To apply the algorithms to a real-world problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models.

Course Outcomes : After completing this course, the student will be able to -

Sr.No	Course outcome number	CO Statement
1	CO1	Appreciate the importance of visualization in the data analytics solution.
2	CO2	Apply structured thinking to unstructured problems.
3	CO3	Understand a very broad collection of machine learning algorithms and problems.
4	CO4	Learn algorithmic topics of machine learning and mathematically deep enough to introduce the required theory.
5	CO5	Develop an appreciation for what is involved in learning from data.

Syllabus:

Course Contents	
Unit I	**Introduction:** Introduction: Basic Definitions, Types of learning- Supervised Learning, Unsupervised Learning, Reinforcement Learning, Hypothesis Space and Inductive Bias, Evaluation and Cross-validation **[6 Hrs.]**
Unit II	**Regressions:** Linear Regression, Logistic Regression, Decision trees, Instance based learning, Principal Component analysis **[6 Hrs.]**
Unit III	Support Vector Machine, Kernel function and Kernel SVM, KNN, Random Forest algorithm **[6 Hrs.]**
Unit IV	Introduction to Ensemble learning techniques, Ensemble Methods, AdaBoost Algorithm Gradient Boosting, XGBoost Algorithm, **[6 Hrs.]**
Unit V	**Advanced Learning:** Clustering, k-means, hierarchical clustering, Gaussian mixture model **[6 Hrs.]**
Text Books	
1	Marco Gori , Machine Learning: A Constraint-Based Approach, Morgan Kaufmann. 2017
2	Ethem Alpaydin, Machine Learning: The New AI, MIT Press-2016
Reference Books	
1	Ryszard, S., Michalski, J. G. Carbonell and Tom M. Mitchell, Machine Learning: An Artificial Intelligence Approach, Volume 1, Elsevier. 2014
2	Stephen Marsland, Taylor & Francis 2009. Machine Learning: An Algorithmic Perspective.
3	Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning Data Mining, Inference, and Prediction
4	Richard O. Duda, Peter E. Hart, David G. Stork. Pattern classification, Wiley, New York, 2001.
Useful links	
1	NPTEL: Introduction to Machine Learning by Prof. Sudeshna Sarkar, IIT Kharagpur. URL: https://onlinecourses.nptel.ac.in/noc21_cs85/preview
2	NPTEL: Essential Mathematics for Machine Learning by Prof. Sanjeev Kumar, Prof. S. K. Gupta, IIT Roorkee URL: https://onlinecourses.nptel.ac.in/noc21_ma38/
3	DataCamp: Machine Learning for Everyone URL: https://www.datacamp.com/courses/machine-learning-for-everyon

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Semester	Course Code	Name of the course	L	T	P	Credits
III	ET3O001	E- Waste Management	3	-	-	3

Prerequisites for the course	
1	Basic knowledge of environmental science, engineering, chemistry, or a related field is beneficial.

Prior Reading Material/ useful links	
1	https://nptel.ac.in/courses/105105169
2	https://www.udemy.com/course/e-waste-management/
3	https://iimm.org/e-waste-management/

Course Objectives:

Sr.No	Course Objectives
1	To enable students to understand scenario of E-waste.
2	To discuss key elements of E-waste management.
3	To impart life skills about E waste management in routine daily life to minimize the hazards.
4	To assess the need for stricter environmental regulations in India, including Extended Producer Responsibility (EPR) programs, import controls, and international legislation like the Basel Convention and the WEEE Directive.

CourseOutcomes: At the end of the course, students will be able to:

Sr.No	Course Outcome Number	CO statement
1	CO1	Understand the fundamental concepts and current issues related to e-waste management.
2	CO2	Apply various principles and practices for e-waste management.
3	CO3	Analyze the environmental and human health impacts of e-waste and evaluate potential solutions.
4	CO4	Evaluate the effectiveness of existing national and international regulations for e-waste management.
5	CO5	Create an informed and responsible plan for e-waste disposal in a specific context.

Syllabus:

Course Contents	
UnitI	**Introduction:**E- waste: composition and generation. Global context in e- waste; E-waste pollutants, E waste hazardous properties, Effects of pollutant (E- waste) on human health and surrounding environment, domestic e-waste disposal, Basic principles of E waste management, Component of E waste management, Technologies for recovery of resources from electronic waste, resource recovery potential of e-waste, steps in recycling and recovery of materials-mechanical processing, technologies for recovery of materials, occupational and environmental health perspectives of recycling e-waste in India. **[8Hrs]**
UnitII	**E-waste hazardous on Global trade**: Essential factors in global waste trade economy, Waste trading as a quint essential part of electronic recycling, Free trade agreements as a means ofwaste trading. Import of hazardous e-waste in India; India's stand on liberalizing import rules, E-waste economy in the organized and unorganized sector. Estimation and recycling of e-waste in metro cities of India. **[8Hrs]**
UnitIII	**E-waste control measures:** Need for stringent health safeguards and environmental protection laws in India, Extended Producers Responsibility (EPR), Import of e-waste permissions, Producer-Public-Government cooperation, Administrative Controls & Engineering controls, monitoring of compliance of Rules, Effective regulatory mechanism strengthened by manpower and technical expertise, Reduction of waste at source. **[8 Hrs]**
Unit IV	**E-waste (Management and Handling) Rules, 2011:** E-Waste (Management) Rules, 2016 - Salient Features and its likely implication. Government assistance for TSDFs. **[8Hrs]**
Unit V	**The International Legislation:** The Basel Convention; The Bamako Convention. The Rotterdam Convention. Waste Electrical and Electronic Equipment (WEEE) Directive in the European Union, Restrictions of Hazardous Substances (RoHS) Directive.**[8Hrs]**
Text Books	
1	E-waste: implications, regulations, and management in India and current global best practices, Johri R., TERI Press, New Delhi
2	Electronic Waste ManagementScience, Hester R.E., and Harrison R.M. 2009
Reference Books	
1	Introduction to E-Waste Management, Laxmi Raghupathy,TERI Press, New Delhi
2	Fowler B, Electronic Waste – 1st Edition (Toxicology and Public Health Issues), 2017,Elsevier
3	Gaidajis, G., Angelakoglou, K.and Aktsoglou, D., 2010. E-waste: environmental problems and current management. Journal of Engineering Science and Technology Review, 3(1), pp.193-199
Useful links	
1	https://news.mit.edu/2013/ewaste-mit
2	https://archive.nptel.ac.in/courses/105/105/105105169/
3	https://www.arsdcollege.ac.in/wp-content/uploads/NEP-SEC-E-waste_sustainability.pdf

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Semester	Course Code	Name of the course	L	T	P	Credits
III	ET3H001	Entrepreneurship Development	2	-	-	2

Prerequisites for the course	
1	Nil

Prior Reading Material/ useful links	
1	http://www.mced.nic.in/
2	https://www.nabard.org/
3	http://www.ediindia.org/publication.html

Course Objectives:

Sr.No	Course Objectives
1	To understand the importance of Innovation and Idea Generation.
2	To understand the concept of entrepreneurship.

Course Outcomes: At the end of the course ,student will be able to:

Sr.No	Course outcome number	CO statement
1	CO1	Identify and validate ideas.
2	CO2	Remember Patent registration of Innovation.
3	CO3	Understand roles and responsibilities of Entrepreneurship
4	CO4	Understand various schemes supporting entrepreneurship

Syllabus:

Course Contents	
Unit I	**Innovation:** Concept of creativity, innovation, invention, discovery. Methods for development of creativity, convergent & divergent thinking etc. Introduction to Intellectual Property Rights (IPR), Patent and laws related to patents. **[7 Hrs]**
Unit II	**Entrepreneurship:** Concept of entrepreneurship, its relations in economic developments, Eventuation of concept of entrepreneur, characteristics of an Entrepreneur, Types of entrepreneurs, Qualities of entrepreneur, Factors affecting growth of entrepreneurship. **[7Hrs]**
Unit III	**Role of Entrepreneurial Bodies:** Theory of achievement, motivation, Medelland's experiment, Women entrepreneurship, Role of SSI, it's advantages & limitations, policies governing small scale industries, Procedure to set up small scale industrial unit, Advantages and limitations of SSI. **[7 Hrs]**
Unit IV	**Role of Entrepreneurial Support:** Factors governing project selection, Market survey, Preparation of project report. Financial, technical & market analysis of project. Entrepreneurial support systems, Role of consultancy organization like, District Industrial Centre, State Industrial Development Corporation, Financial institution, Latest SSI schemes of DIC (to be confirmed from DIC from time to time. **[7Hrs]**
Text Books	
1	Entrepreneurship Development, S. S. Khanka, S. Chand Publication.
Reference Books	
1	Creativity Innovation & Entrepreneurship, Zechariah James Blanchard, Needle Rat Business Publishers.
Useful links	
1	https://www.entrepreneur.com/article/247574/
2	http://www.dcmsme.gov.in/schèmes/tequpdetail.htm
3	https://smallb.sidbi.in/entrepreneurship- stage/thinking-entrepreneurship

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Program: B.Tech in Electronics and Telecommunication Engineering

Semester	Course Code	Name of the course	L	T	P	Credits
III	ET3V001	Universal Human Values -II	2	0	0	2

Prerequisites for the course	
1	Basic concepts of subject Universal Human Values –I studied in Second Semester.

Prior Reading Material/useful links	
1	https://nptel.ac.in/courses/109104068
2	Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010

Course Outcomes:

Sr. No	Course outcome number	CO statement
1	CO1	Understand and associate the holistic perception of harmony at all levels of existence.
2	CO2	Identify the role of harmony in family, society and universal order.
3	CO3	Analyze the essentials of human values and skills, self exploration, happiness and prosperity.
4	CO4	Evaluate coexistence of the "I" with the body.
5	CO5	Develop appropriate technologies and management patterns to create harmony in professional and personal lives.

Syllabus:

Course Contents	
Unit I	Course Introduction - Need, Basic Guidelines, Content and Process for Value Education Purpose and motivation for the course, recapitulation from Universal Human Values-I . Self-Exploration–what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration. Continuous Happiness and Prosperity- A look at basic Human Aspirations . Right understanding, Relationship and Physical Facility- the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario. Method to fulfil the above human aspirations: understanding and living in harmony at various levels. Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking. (7 Hours)
Unit II	Understanding Harmony in the Human Being - Harmony in Myself! Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body' - happiness and physical facility. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I'. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure. Sanyam and Health. Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease (7 Hours)
Unit III	Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship. Understanding the meaning of Trust; Difference between intention and competence. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family. Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives. (7 Hours
Unit IV	Understanding Harmony in the Nature and Existence - Whole existence as Coexistence Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self- regulation in nature. Understanding Existence as Co-existence of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence. Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc. (7 Hours)
Unit V	Implications of the above Holistic Understanding of Harmony on Professional Ethics Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and

	characteristics of people- friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems. Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers b. At the level of society: as mutually enriching institutions and organizations. (7 Hours)
Text Books	
1	Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
Reference Books	
1	Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
Useful links	
1	https://nptel.ac.in/courses/109104068

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Program: B.Tech in Electronics and Telecommunication Engineering

Semester	Course Code	Name of the course	L	T	P	Credits
III	ET3L005	Electronics Devices and Circuit Lab	0	0	2	1

Prerequisites for the course	
1	Basic knowledge of Electronic Devices·

Prior Reading Material/ useful links	
1	https://onionesquereality.wordpress.com/.../more-video-lectures-tit-open
2	http://www.electronics-tutorials.as/transistor/tran1.html
3	http://was.allaboiitcircuits.com/textbook/semiconductors/chpt-I/active-versus-passivedevices/

Course Objectives:

Sr. No	Course Objectives
1	To identify Basic electronic components and devices.
2	To observe the characteristics of MOSFET, CMOS Inverter, UJT.
3	To impart different amplifier configurations and their Frequency response.
4	To design and Simulate Electronic circuits.

Course Outcomes: At the end of the course students will be able to:

Course outcome number	CO statement
CO1	**Identify** Basic electronic components and devices
CO2	**Observe** the characteristics of MOSFET, CMOS, FET, UJT
CO3	**Analyze** different amplifier configurations and their Frequency response
CO4	**Design** and Simulate Electronic circuits

	List of Practicals
Expt.1	To calculate ripple factor of full wave rectifier with and without filter.
Expt.2	To plot the characteristics of clipper circuit & to perform simulation on Multisim
Expt.3	To plot the characteristics of clamper circuit & to perform simulation on Multisim.
Expt.4	To design Zener Diode as a Voltage Regulator & to perform simulation on Multisim.
Expt.5	To design a transistor shunt voltage regulator on Multisim.
Expt.6	To design emitter follower type of voltage regulator using darlington pair and simulate it on Multisim
Expt.7	To design pushpull class A power amplifier and simulate it on Multisim
Expt.8	To design class AB audio power amplifier and simulate it on Multisim
Expt.9	To design Hartley oscillator and simulate it on Multisim.
Expt.10	To design a Wein Bridge Oscillator and simulate it on Multisim.
Expt.11	To design RC Phase Shift Oscillator and simulate it on Multisim.
Expt.12	To plot the drain & transfer characteristics of FET in CS mode & to perform simulation on Multisim.
Expt.13	To verify frequency response of single stage RC coupled amplifier & to perform simulation on Multisim.
Expt.14	To design a CMOS inverter using microwind.
Expt.15	To design a CMOS inverter using microwind.
Expt.16	Open Ended experiments.

	Text Books
1	Neil Weste and David Harris, Addison-Wesley "CMOS VLSI Design — A Circuits and Systems Perspective", Fourth edition, Pearson
2	Donald Neaman, "Electronic Circuit Analysis and Design", Third Edition, Tata McGraw Hill
3	Millnian, Halkias, "Integrated Electronics- Analog and Digital Circuits and Systems",Second Edition , Tata McGraw Hill

	Reference Books
1	Brijeshlyer, S. L. Nalbalwar, R. Dudhe, "Electronics Devices & Circuits", Synergy Knowledgeware Mumbai, 2017. 1SBN:9789383352616.
2	David A. Bell, "Electronic Devices and Circuits", Fourth Edition, PH1.
3	Floyd, "Electronic Devices", Seventh Edition, Pearson.
4	Sedra and Smith, "Microelectronic Circuits", Oxford University Press, 2004.

	Useful links
1	https://npte1.ac.in/content/storage2/courses/117101058/downloads/
2	http://www.nesoacademy.org/electronics-engineering/analog-electronics/analog

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Program: B.Tech in Electronics and Telecommunication Engineering

Semester	Course Code	Name of the course	L	T	P	Credits
III	ET3L006	Analog Circuits Lab	0	0	2	1

Prerequisites for the course	
1	**Basic knowledge of Electronics circuits and components**

Prior Reading Material/ useful links	
1	https://nptel.ac.in/courses/117102059
2	https://kanchiuniv.ac.in/academics/department-of-electronics-and-communication-engineering/nptel-videos/
3	https://www.studocu.com/in/document/apj-abdul-kalam-technological-university/analog-communication-engineering/lec60-analog-communication/26979180

Course Objectives:

Sr.No	Course Objectives
1	Design and test of analog circuits using OPAMPs
2	Understand the feedback configurations of transistor and OPAMP circuits
3	Use of circuit simulation for the analysis of electronic circuits.

Course Outcomes: At the end of the course students will be able to:

Sr.No	Course outcome number	CO statement
1	CO1	Understand the feedback configurations OPAMP circuits
2	CO2	Apply the knowledge of circuit simulation for the analysis of electronic circuits.
3	CO3	Design Analog circuits using OPAMPs for different applications
4	CO4	Design 555 timer for Monostable and astable Multivibrator

Syllabus:

Course Contents	
Expt.1	To Know Your Lab
Expt.2	To measure the following parameters of an Op-amp i.e, input bias current, input offset voltage, input offset current, CMRR and slew rate
Expt.3	To study and design first-order LPF using an op-amp IC 741 and to obtain frequency response.
Expt.4	To study and design first-order HPF using an op-amp IC 741 and to obtain frequency response.
Expt.5	To study the input and output characteristics of inverting and non-invertig amplifier
Expt.6	To study the applications of IC 741 as adder, subtractor, comparator.
Expt.7	To determine the frequency of oscillations of a LC Oscillator using PSPICE or MULTISIM
Expt.8	To design and study D/A and A/D converter circuit.
Expt.9	To Design Integrator and Differentiator circuits using Op-Amp
Expt.10	To determine the frequency of oscillation of an RC Phase Shift Oscillator usingMultisim.
Expt.11	Design Monostable and a stable Multivibrator using 555 Timer.
Text Books	
1	Microelectronic Circuits, Theory and Applications, Adel S Sedra, Kenneth C Smith, 6th Edition, Oxford, 2015.ISBN:978-0-19-808913-1
2	Op-Amps and Linear Integrated Circuits, Ramakant A Gayakwad, 4th Edition. Pearson Education, 2000. ISBN: 8120320581
3	Linear Integrated Circuits – D. Roy Choudhury, New Age International (p) Ltd, 2nd Edition,2003
Reference Books	
1	Operational Amplifiers & Linear Integrated Circuits –Sanjay Sharma ;SK Kataria &Sons;2nd Edition,2010
2	OP AMPS and Linear Integrated Circuits concepts and Applications, James M Fiore, Cenage Learning India Ltd
3	Operational Amplifiers & Linear Integrated Circuits–R.F.Coughlin & Fredrick Driscoll, PHI, 6th Edition
4	Operational Amplifiers & Linear ICs – David A Bell, Oxford Uni. Press, 3rd Edition
Useful links	
1	https://youtu.be/311XkpNGs8c
2	http://kabuki.eecs.berkeley.edu/~keitho/ic771ca/

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Semester	Course Code	Name of the course	L	T	P	Credits
III	ET3L007	Digital System Design Lab	0	0	2	1

Prerequisites for the course	
1	To provide hand-on experience in designing and implementing digital/logic circuits.

Prior Reading Material/ useful links	
1	http://ozark.hendrix.edu/~burch/logisim/

Course Objectives:

Sr. No	Course Objectives
1	To familiarize with logic gates with VHDL codes.
2	To understand the design of different types of modeling.
3	To understand state machine with sequence detector.

Course Outcomes: At the end of the course students will be able to:

Sr. No	Course outcome number	CO statement
1	CO1	**Model** multiplexer, adder and subtractor.
2	CO2	**Model** a flip/flops.
3	CO3	**Design** Parity generator.
4	CO4	**Design** and simulate electronics circuit.

Course Contents:

List of Experiments	
Expt.1	Write a VHDL code for different logic gates.
Expt.2	Design 4:1 multiplexer and write a VHDL code for same using data flow style of modelling.
Expt.3	Design 4-to-16 decoder by combining two 3-to-decoders and write a VHDL code for same using behavioural style of modelling.
Expt.4	Design BCD to & segment decoder and write a VHDL code for same using behavioural style of modelling.
Expt.5	Design of F/F and write a VHDL code for same using behavioural style of modelling.
Expt.6	Design half adder and full adder and write a VHDL code for same using dataflow style of modelling.
Expt.7	Design a 9-bit Parity generator circuit and write a VHDL code for the same using structural style of modelling.
Expt.8	Design a Decade Counter using J-K flip-flops and write a VHDL code for the same using structural style of modelling.
Expt.9	Design Three –bit up-down counter and write a VHDL code for the same using structural style of modelling.
Expt. 10	Design of Finite state machine to detect a sequence "1011" using Mealy model .and write VHDL code for the same.
Expt.11	Design a 4 bit comparator
Expt.12	Design 16:1 MUX using 4:1 MUX using structural style of modeling.
Expt.13	Design Arithmetic and Logic Unit.
Expt.14	Implementation & Testing of Counter on Xilinx FPGA. **(Virtual Lab)**
Expt.15	Implementation & Testing of Clock circuits on Xilinx FPGA. **(Virtual Lab)**
Expt.16	Open ended experiments. **(Beyond the Syllabus)**
Text Books	
1	Michael D. Ciletti, M. Morris Mano, Digital Design, 4/e. Pearson Education, 2007
Reference Books	
1	ZviKohavi, Switching and Finite Automata Theory, 2/e, Tata McGraw-Hill Education, 2008.
2	John F. Wakerly, Digital Design Principles and Practices, 4/e, Pearson Education, 2008
Useful links	
1	http://www.ece.ubc.ca/~saifz/eece256.html
2	http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT%20Guwahati/digital_circuit /frame/index.html

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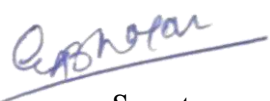## Department of Electronics and Telecommunication Engineering

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Scheme for B. Tech in Electronics and Telecommunication Engineering (w.e.f. 2024-25)

B. Tech Fourth Semester

Sr. No.	Category of Course	Course Code	Course Name	Teaching Scheme			Evaluation Scheme				Credits
				L	T	P	CA	MSE	ESE	Total	
1	PCC	ET4T001	Signals and Systems	2	0	0	20	20	60	100	2
2	PCC	ET4T002	Analog & Digital Communication System	3	0	0	20	20	60	100	3
3	MDM	ET4M002	Soft Computing	2	0	0	20	20	60	100	2
4	OE	ET4O002	Open Elective -II	2	0	0	20	20	60	100	3
5	AEC	ET4A001	Principles of Corporate Success	2	0	0	20	20	60	100	2
6	EEMC	ET4H002	Engineering Economics	2	0	0	20	20	60	100	2
7	VEC	ET4V002	Intellectual Property Rights	2	0	0	20	20	60	100	2
8	PCC	ET4L003	Python Programming Lab	0	0	2	60	0	40	100	1
9	PCC	ET4L004	Analog & Digital Communication System Lab	0	0	2	60	0	40	100	1
10	VSEC	ET4L005	Drone Technology	0	0	4	60	0	40	100	2
11			MOOC Course (NPTEL)				40	0	60	100	2
			Total	**15**	**0**	**8**	**360**	**140**	**600**	**1100**	**22**

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Semester	Course Code	Name of the course	L	T	P	Credits
IV	ET4T001	Signals and Systems	2	0	0	2

	Prerequisites for the course
1	Basic Idea of Transform and its mathematical descriptions (Laplace, Fourier and Z Transform)
2	Differential equations and Integrals (advanced level) and Ordinary differential equations
3	Series and expansions
4	Fourier analysis and complex Fourier Series/transform
5	Applications of Fourier series, Fourier Transform to circuits

	Prior Reading Material/useful links
1	https://archive.nptel.ac.in/courses/111/106/111106111/
2	https://archive.nptel.ac.in/courses/111/105/111105123/
3	www.digimat.in/nptel/courses/video/111106139/L22.html

Course Objectives:

Sr. No	Course Objectives
1	To develop a strong foundation of continuous and discrete time signal and system.
2	To Introduce ideas for analysis of various types of continuous & discrete time system.
3	Learn fundamental concepts and transforms as relevant to time and frequency domain Signals.

Course Outcomes: At the end of the course, students will be able to

Sr.No	Course outcome number	CO statement
1	CO1	Understand different types of signals & systems
2	CO2	Familiar with the properties of LTI (Linear Time Invariant System) system and process involved inanalysis of signals before transmission
3	CO3	Solve various complex mathematical problems for signal analysis and conversion of signals from onedomain to another.
4	CO4	Analyze continuous and discrete systems in time and frequency domain
5	CO5	Design Various Mathematical models to Investigate properties of the system.

Syllabus:

	Course Contents
Unit I	**Basics of Signals and System:** Introduction and Classification of signals, Definition of signal, Continuous time and discrete time signal, Classification of signals as even, odd, periodic and non-periodic, Deterministic and non-deterministic, energy and power, elementary signals used for testing, Exponential, sine, impulse, step and its properties, ramp, rectangular, triangular, signum, sinc, Operations on signals, Amplitude scaling, addition, multiplication, differentiation, integration, time scaling, time shifting and time folding, Systems Definition, Classification, linear and non-linear, time variant and invariant, causal and non-causal, static and dynamic, stable and unstable, invertible **[9 Hours]**
Unit II	**Time Response Analysis:** Discrete-Time LTI (Linear Time Invariant System) Systems, the Convolution Sum, Continuous-Time LTI Systems, the Convolution Integral, Properties of Linear Time-Invariant Systems, Causal LTI Systems Described by Differential and Difference Equations. **[7 Hours]**
Unit III	**Fourier Series Analysis:** The Response of LTI Systems to Complex Exponentials, Fourier Series Representation of Continuous- Time Periodic Signals, Types of Fourier Series, Convergence of the Fourier Series, Properties of Continuous-Time Fourier Series, Fourier Series Representation of Discrete-Time Periodic Signals, Properties of Discrete-Time Fourier Series. **[7 Hours]**
Unit IV	**Fourier Transform Analysis:** The Continuous-Time Fourier Transform, Representation of Aperiodic Signals, The Fourier Transform forPeriodic Signals, Properties of the Continuous-Time Fourier Transform, Systems Characterized by Linear Constant-Coefficient Differential Equation, The Discrete-Time Fourier Transform, Properties of the Discrete-Time Fourier Transform **[7 Hours]**
	Text Books
1	Simon Haykin, Barry van Veen, "Signals and Systems", John Wiley and Sons (Asia), Private Limited
2	B. P. Lathi, "Linear Systems and Signals", OXFORD University Press.
3	A.V. Oppenheim, A.S. Willsky and I.T. Young, "Signals and Systems", Prentice Hall,1983.
4	A. NagoorKanni "Signals and Systems", 2nd Edition, McGraw Hill.
	Reference Books
1	J. Nagrath, S. N. Sharan, R. Ranjan, S. Kumar, "Signals and Systems", TMH New Delhi,2001
2	M. J. Roberts, "Signals and Systems - Analysis using Transform methods and MATLAB", TMH, 2003
3	Signals Systems and Transforms, 3rd Edition, 2004, C. L. Philips, J.M.Parr and EveA. Riskin , Pearsoneducation
4	S. S. Soliman & M.D. Srinath, "Continuous and Discrete Signals and Systems", Prentice-Hall, 1990
5	Shaila Dinkar Apte "Signals and Systems" Principles and Applications", Cambridge University Press.
	Useful links
1	NPTEL link principal of signals and system. https://www. m0yRYwTjwxaqapPsSAHzs4_nkQLVr
2	E-BOOK Signal and Systems Simon Haykin Wiley https://www.academia.edu/38588821/Signal_and_Systems_Simon_Haykin_Wiley
3	E-BOOK B. P. Lathi, "Linear Systems and Signals", **https://india.oup.com/productPage/5591038/7421214/9780198062271**

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Program: B.Tech in Electronics and Telecommunication Engineering

Semester	Course Code	Name of the course	L	T	P	Credits
IV	ET4T002	Analog and Digital communication System	3	0	0	3

Prerequisites for the course	
1	Basic Knowledge of Analog and digital electronics.
2	Basic Knowledge of Signals and systems

Prior Reading Material/useful links	
1	https://www.youtube.com/watch?v=orzHtrLGj6E
2	https://archive.nptel.ac.in/courses/108/105/108105132/
3	https://www.digimat.in/nptel/courses/video/117101051/L21.html

Course Objectievs:

Sr. No	Course Objectives
1	To study basic components of analog and digital communication systems.
2	To study various pulse modulation and demodulation techniques used in transmission of analog signal.
3	To understand the concept of sampling and quantization in digital transmission system.
4	To analyze different modulation and demodulation techniques in analog and digital communication .

Course Outcomes: At the end of the course, students will be able to

Sr.No	Course outcome number	CO statement
1	CO1	Understand the necessity of modulation and identify the various components of analog and Digital communication systems.
2	CO2	Demonstrate various analog and digital communication techniques.
3	CO3	Compare and contrast the strengths and weaknesses of various communication systems.
4	CO4	Analyse various Analog and Digital Modulation and Transmission Techniques.
5	CO5	Implement the Analog and Digital Communication System.

Syllabus:

	Course Contents
Unit I	**Introduction to Communication systems and Amplitude Modulation** Elements of Communication System, Need for modulation, Signal representation and analysis.Types and sources of Noise in communication systems.Modulation, need of modulation, AM Modulation (Mathematical expression and related numericals), Principles of DSB-FC, DSBSC, SSB-SC , VSB modulation and their comparison. **[8 Hrs]**
Unit II	**Frequency Modulation** FM Modulation, Circuit & Analysis for direct FM generation using FET. Circuit& analysis of Indirect FM generation, Narrow Band and Wide Band FM, their comparison, Preemphasis and Deemphasis.FM Receiver block diagram including Limiter. FM Discriminator: Introduction to Single Slope and Balanced slope detector, Foster Seeley and Ratio detectors. Comparison of performance of AM & FM systems. **[8 Hrs]**
Unit III	**Pulse Modulation** Band limited & time limited signals, Narrowband signals and systems, Sampling Theorem in time domain, Nyquist criteria, ISI, Types of sampling ideal, natural, flat top, Aliasing & Aperture effect. Analog modulation techniques: PAM, PWM & PPM. Digital representation of Analog signal, PCM Generation and Reconstruction: Quantization and its types, Companding, Quantization Noise, Differential Pulse Code Modulation, Delta Modulation, Adaptive Delta Modulation. **[8 Hrs]**
Unit IV	**Introduction to Digital Communication** Model of digital communication system, advantages of digital communication systems, Source coding Theorem, Shannon Fano Coding, Huffman coding-Z encoding algorithm, Rate distortion theory for optimum quantization, scalar & vector quantization. Waveform coding methods: ADPCM, Adaptive Sub-Band & Transform coding, LP & CELP coding. **[8 Hrs]**
Unit V	**Digital Modulation Techniques** Amplitude Shift Keying (ASK) – Frequency Shift Keying (FSK)–Phase Shift Keying (PSK) – BPSK – QPSK , DPSK – Quadrature Amplitude Modulation (QAM) ,MSK, Gaussian MSK, Comparison of various digital modulation systems. **[8 Hrs]**
	Text Books
1	Modern Digital and Analog Communication Systems, 4th edition, by B. P. Lathi and Zhi Ding, published by Oxford University Press, ISBN: 978-0-19-533145-5.
2	Communication Systems by Simon Haykin, 4th Edition, published by John Wiley and Sons, 2001, ISBN 0-471-17869-1.
	Reference Books
1	Bernard Sklar, Digital communication, 2/e, Pearson Education, 2007.
2	Taub & Schilling, Principles of Communication Systems, 4/e, McGraw Hill, 2013
3	Singh R.P. & Sapre, Communication systems Analog & Digital, TMH, 2007
	Useful links
1	http://www.web.eecs.utk.edu
2	https://everythingvtu.wordpress.com
3	http://www.ocw.nthu.edu.tw

JAIDEV EDUCATION SOCIETY'S
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Department of Electronics and Telecommunication Engineering
"Rectifying Ideas, Amplifying Knowledge"
Session: 2024-25

VISION	MISSION
"To be a Department providing high quality & globally competent knowledge of concurrent technologies in the field of Electronics and Telecommunication."	1. To provide quality teaching learning process through well-developed educational environment and dedicated faculties. 2. To produce competent technocrats of high standards satisfying the needs of all stakeholders.

Program: B.Tech in Electronics & Telecommunication Engineering

Semester	Course Code	Name of the course	L	T	P	Credits
IV	ET4M002	Soft Computing	2	-	-	2

Prerequisites for the course	
1	Basic Knowledge of machine learning & algorithms

Course Objectives:

Sr.No	Course Objectives
1	To Understand the basic theory underlying Soft Computing Concepts, technologies, and applications
2	To Understand the underlying principle of soft computing with its usage in various application.
3	To Understand different soft computing tools to solve real life problems
4	To Apply Genetic algorithms to solve problems of moderate complexity.

Course Outcomes: After completing this course, the student will be able to -

Sr.No	Course outcome number	CO Statement
1	CO1	Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory
2	CO2	Solve single-objective optimization problems using GAs
3	CO3	Solve multi-objective optimization problems using Evolutionary algorithms
4	CO4	Implement various Neural Network Architectures for solving complex problems
5	CO5	Develop application on different soft computing techniques like Fuzzy, GA and Neural network

Syllabus

Course Contents	
Unit I	Introduction to Soft Computing, Introduction to Fuzzy logic, Fuzzy membership functions, Operations on Fuzzy sets, Fuzzy relations, Fuzzy propositions, Fuzzy implications, Fuzzy inferences. **[6 Hrs.]**
Unit II	Defuzzyfication Techniques-I, Defuzzyfication Techniques-II, Fuzzy logic controller-I, Fuzzy logic controller-II **[6 Hrs.]**
Unit III	Solving optimization problems, Concept of GA, GA Operators: Encoding, GA Operators: Selection-I, GA Operators: Selection-II, GA Operators: Crossover-I, GA Operators: Crossover-II, GA Operators: Mutation [**6 Hrs.**]
Unit IV	Introduction to Artificial Neural Networks, Learning rules and various activation functions, Single layer Perceptrons, Backpropagation networks, Architecture of Backpropagation(BP)Network. **[6 Hrs.]**
Unit V	Introduction to Associative Memory, Adaptive Resonance theory and Self Organizing Map, Recent Applications **[6 Hrs.]**

Text Books	
1	R. Rajasekaran and G. A and Vijayalakshmi Pa, Neural Networks, Fuzzy Logic, and Genetic Algorithms: Synthesis and Applications, Prentice Hall of India
2	D. E. Goldberg, Genetic Algorithms in Search, Optimisation, and Machine Learning, Addison-Wesley
3	M Amirthavalli, Fuzzy Logic and Neural Networks, Scitech Publications

Reference Books	
1	Jacek M. Zurada, Artificial Neural Systems, PWS Publishing, Boston, 1992 (ISBN 0-314-93391-3)
2	Evolutionary Computation: A Unified Approach by Kenneth A. DeJong, MIT Press, 2006, ISBN: 0262041944

E-Books	
1	Timothy J Ross, Fuzzy Logic with Engineering Applications https://www.academia.edu/5333146/Fuzzy_Logic_with_Engineering_Applications_Third_Edition
2	Mitchell Melanie, An Introduction to Genetic Algorithms, https://www.boente.eti.br/fuzzy/ebook-fuzzy-mitchell.pdf

Useful links	
1	https://nptel.ac.in/courses/106/105/106105173/

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Department of Electronics and Telecommunication Engineering

"Rectifying Ideas, Amplifying Knowledge**"**

Session :2024-25

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Program: B.Tech in Electronics and Telecommunication Engineering

Semester	Course Code	Name of the course	L	T	P	Credits
IV	ET4L003	Python Programming Lab	0	0	2	1

Prerequisites for the course	
1	Basic understanding of Computer Programming & Logic.

	Prior Reading Material/ useful links
1	https://realpython.com/python-modules-packages/
2	https://docs.python.org/3/tutorial/index.html
3	https://www.w3schools.com/python/

Course Objectives:

Sr. No	Course Objectives
1	Introduce Python syntax and basic programming concepts.
2	Familiarize students with data types and control structures in Python.
3	Develop skills in writing and using functions to solve problems.
4	Provide hands-on experience in GUI development using libraries

Course Outcomes: At the end of the course, students will be able to

Sr. No	Course outcome number	CO statement
1	CO1	Demonstrate proficiency in basic Python syntax and programming concepts.
2	CO2	Apply object-oriented programming principles to design and implement Python classes and objects.
3	CO3	Analyze and manipulate various data structures such as lists, tuples, dictionaries, and sets.
4	CO4	Create, test, and debug simple Python programs.
5	CO5	Develop skills in creating simple graphical user interfaces for enhanced user interaction using Python libraries.

List of Experiments:

Expt.1	Introduction to IDLE software and Basic Python programming.
Expt.2	Create a list and perform the following methods 1) insert() 2) remove() 3) append() 4) len() 5) pop() 6) clear()
Expt.3	Create a dictionary and apply the following methods 1) Print the dictionary items 2) access items 3) use get() 4)change values 5) use len()
Expt.4	Create a tuple and perform the following methods 1) Add items 2) len() 3) check for item in tuple 4)Access items
Expt.5	Implement python program that read from and write to files, as well as perform basic file manipulation operations.
Expt.6	Write a python program to find largest number among three numbers.
Expt.7	Develop a python program to display a particular month of a year using calendar module.
Expt.8	Create a python program to print date, time using date and time functions.
Expt.9	Develop a python program which accepts the radius of a circle from user and computes the area (use math module).
Expt.10	Write a program to read 3 subject marks and display pass or failed using class and object.
Expt.11	Create a python code to read a csv file using pandas module and print the first and last five lines of a file
Expt.12	Write a python code to set background color and pic and draw a circle using turtle module
Expt.13	Implement a file handling program to count the number of words in a text file.
Expt.14	Develop a python program using turtle graphics to draw spiral.
Expt.15	Develop a python program to draw smiley face using turtle graphics.
Expt.16	Develop a python program to find all prime number within a given range.
Expt.17	Create a Python class to represent a basic bank account.
Expt.18	Develop a basic calculator GUI using Tkinter.
Expt.19	Create a program to convert temperature from Celsius to Fahrenheit.
Expt.20	Develop a program using inheritance to model different types of vehicles.
Text Books	
1	Python Programming for Absolute Beginners , Michel Dawson, Third Edition, Course Technology Cengage Learning Publications, 2013
2	Fundamentals of Python – First Programs, Kenneth A. Lambert ,CENGAGE Publication.

Reference Books	
1	Learning Python, Mark Lutz, 5th edition, Orelly Publication, 2013,
2	Core Python Applications Programming,Wesley J. Chun, 3rd Edition , Pearson Education, 2016

Useful links	
1	https://onlinecourses.nptel.ac.in/noc24_cs57 /preview
2	https://onlinecourses.nptel.ac.in/noc24_cs54/preview
3	https://onlinecourses.nptel.ac.in/noc24_cs45/preview

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Program: B.Tech in Electronics and Telecommunication Engineering

Semester	Course Code	Name of the course	L	T	P	Credits
IV	ET4L004	Analog and Digital Communication Lab	0	0	2	1

Prerequisites for the course	
1	Basic Knowledge of Analog and digital electronics.
2	Basic Knowledge of Signals and systems

Prior Reading Material/ useful links	
1	https://nptel.ac.in/courses/117102059
2	https://kanchiuniv.ac.in/academics/department-of-electronics-and-communication-engineering/nptel-videos/
3	https://www.studocu.com/in/document/apj-abdul-kalam-technological- university/ analog-communication-engineering/lec60-analog- communication/26979180

Course Objectives:

Sr.No	Course Objectives
1	To Impart the basic concepts of analog modulation schemes.
2	Describe different types of noise and predict its effect on various analog communication systems.
3	To understand the key modules of digital communication systems with emphasis on digital modulation techniques.

Course Outcomes: At the end of the course, students will be able to

Sr.No	Course outcome number	CO statement
1	CO1	Understand the Basics of Analog and Digital Communication Systems.
2	CO2	Compare different communication systems by analyzing in time and frequency domain
3	CO3	Analyse the various Analog and Digital Modulation and Transmission Techniques
4	CO4	Able to identify and describe different analog modulation techniques.

List of Experiments:

	Name of Practical
Expt.1	To generate amplitude modulated wave and determine the percentage modulation.
Expt.2	To generate frequency modulated signal and determine the modulation index and bandwidth for various values of amplitude and frequency of modulating signal.
Expt.3	To generate SSB using phase method and detection of SSB signal using Synchronous detector.
Expt.4	To generate DSB using phase method and detection of DSB signal using Synchronous detector
Expt.5	To observe frequency modulated waveform and to measure peak frequency deviation for 2V peak to peak modulating signal
Expt.6	To implement the pulse width modulated and demodulated signals
Expt.7	To study the process of ASK modulation& demodulation and study various data formatting modulation and demodulation techniques.
Expt.8	To Study of carrier Modulation techniques by phase shift keying method
Expt.9	To study the Delta modulation process by comparing the present signal with the previous signal of the given modulating signal.
Expt.10	To study operation Differential Phase shift Keying modulation & demodulation Techniques.
Expt.11	Write a MATLAB program to implement the Quadrature Phase Shift Keying
Expt.12	Write a MATLAB program to implement the Linear Block Code Encoder and Decoder.
Expt.13	Write a MATLAB program for implementation of Binary Cyclic Codes Encoder and Decoder
	Text Books
1	J. G. Proakis and M. Salehi, "Communication system engineering", 2/e, Pearson Education Asia, 2002.
2	R. E. Ziemer, W. H. Tranter, "Principles of Communications: Systems, Modulation, and Noise", 5/e, John Wiley & Sons, 2001.
3	Simon Haykins and Michael Moher,"Communication Systems", 5th Edition, John Wiley and sons, 201
4	Communication Systems - Analog and digital, Singh and Sapre, 2nd edition, 2007, TMH.
	Reference Books
1	Wayne Tomasi, "Electronic Communications Systems – Fundamentals Through advanced", 5th Edition Pearson Education, 2012
2	H. Taub and D. L. Schilling, Principles of Communication Systems, 3rdReprint,McGraw Hill, 2006.
3	George Kennedy and Bernard Davis," Electronic Communication systems", 4thEdition, TMH, 2008
4	Modern digital and analog Communication systems, B. P. Lathi, 3rd edition, 2015, Oxford University Press.
5	Roddy and Coolen, "Electronic Communication Systems", Pearson Education.
6	Frank R. Dungan, "Electronic Communication Systems", Delmar Publishers.

Useful links	
1	https://mrcet.com/downloads/digital_notes/ECE/III%20Year/ANALOG%20COMMUNICATIONS-18.pdf
2	https://www.jntua.ac.in/gate-online-classes/registration/downloads/material/a159050820125.pdf

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Program: B.Tech in Electronics and Telecommunication Engineering

Semester	Course Code	Name of the course	L	T	P	Credits
IV	ET4L005	Drone Technology	0	0	4	2

	Prerequisites for the course
1	Basic knowledge of electronic and electrical components and circuits.
2	Ability to read and interpret circuit diagrams.

	Prior Reading Material/useful links
1	https://www.youtube.com/watch?v=yaAf4eofppc
2	https://www.youtube.com/watch?v=yaAf4eofppc

Course Objectives:

Sr. No	Course Objectives
1	To provide students with hands on operation of Drones including a practical Understanding of physics of Drone flight.
2	To develop scientific thinking skills, logical and critical thinking skills and Problem solving skills.
3	To introduce and expose students to technical skills required for UAV (unmanned aerial vehicle) operation.
4	To get equipped with information about potential career paths in UAV Technology.
5	To understand basics of Drones operation and modification including software changes, autonomous and controlled line of sight flight

Course Outcomes: At the end of the course, students will be able to

Sr. No	Course Outcome Number	CO statement
1	CO1	Understand the concepts and techniques used in design of a small drones and its applications.
2	CO2	Identify & select different types of drones, drone rules and regulations, Drone applications, and important safety precautions.

3	CO3	Choose different drone's mechanical parts, aerodynamics of wings,propellers and disassembly and reassembly of common drone platform with flying practices
4	CO4	Test various electronic SMD components using proper measuring.

Syllabus

Course Contents	
Unit-I	**Introduction To Drone Technology** Drone Concept – Vocabulary Terminology- History of drone – Types of current generation of drones based on their method of propulsion- Drone technology impact on the Business. **[4 Hrs]**
Unit-II	**Drone Design and Assembly** Design considerations for drone airframe and propulsion systems, Selecting and assembling drone. Components such as motors, batteries, flight controllers, and cameras, Basic wiring and soldering techniques. **[6 Hrs]**
Unit-III	**Drone Motors and Electronic Speed Controller** Working, Types: Brush and Brushless Motors, motor sizing and identification, mounting patterns and thread size, Thrust to Weight ratio, KV ratings, advanced motorselection, Electronic Speed Controller. **[5Hrs]**

Course Contents	
Activity 1	Identify drone designing materials required for the drone development.
Activity 2	Study drone Simulation Software.
Activity 3	Mapping Components of an electronic circuit and Setting Parameters for drone design.
Activity 4	Identify the drone for designing purpose.
Activity 5	Identify various components like motor.
Activity 6	Testing the components.
Activity 7	Assembling the components.
Activity 8	Testing of an electronic Circuit
Activity 9	Develop Drone using electronic Circuits.
Activity 10	Testing the drone.
Text Books	
1	M. LaFay, Building Drones for Dummies, John Wiley & Sons, Inc., n.d.
2	E. Tooley, Practical Drones: Building, Programming, and Applications, Apress, 2021.
3	D. Levy, Drone Programming: A Guide to Code Your Own Drones, Packt Publishing, n.d.
4	S. K. Kopparthy, Drone Technology: Theory and Practice, Springer, 2020.
Reference Books	

1	D. Saxby, Drone Aerial Photography and Video: Techniques and Stories from the Field, Cengage Learning, 2018.
2	D. McLeod, Getting Started with Drone: How to Build, Fly, and Program Your Own Drone, Apress, 2019.
3	M. A. Banks, Building and Flying Electric Model Aircraft, O'Reilly Media, Inc., 2014.
Useful links	
1	https://www.youtube.com/watch?v=Ab9Nm4CXmL0
2	https://www.youtube.com/watch?v=jrFBko3k49w