Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's
Sharad Institute of Technology College of Engineering
(An Autonomous Institute)
Yadrav (Ichalkaranji)-416121, Dist. – Kolhapur

Teaching and Evaluation Scheme for S Y B. Tech.

Department of Electronics and Telecommunication Engineering

Semester: IV

Head of the Dept.
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's

Sharad Institute of Technology College of Engineering

(An Autonomous Institute)

Yadrav (Ichalkaranji)-416121, Dist. – Kolhapur

Department: Electronics &Telecommunication Engg **Rev:** Course Structure/00/2021-22

Class: S.Y. B. Tech **Semester:** IV

Course Code	Course Type	Course	Teaching Scheme				Evaluation Scheme					Credits
			L	T	P	Total Hrs.	CA1	CA2	MSE	ESE	Total	
ET401	PCC	Analog &Digital Communication	3	-	-	3	10	10	30	50	100	3
ET402	PCC	Microprocessor and Microcontroller	3	-	-	3	10	10	30	50	100	3
ET403	PEC	Elective -I	4	-	-	4	10	10	30	50	100	4
ET404	PCC	Linear Integrated Circuits	3	-	-	3	10	10	30	50	100	3
ET405	BSC	Numerical Methods	3	-	-	3	10	10	30	50	100	3
ET406	PCC	Analog &Digital Communication Laboratory	-	-	2	2	15	15	-	20	50	1
ET407	PCC	Microprocessor and Microcontroller Laboratory	-	-	2	2	15	15	-	20	50	1
ET408	PCC	Linear Integrated Circuits Laboratory	-	-	2	2	15	15	-	20	50	1
MDC01	MC	Constitution of India	1	-	-	1	25	25	-	-	50	Audit
HMS03	HSMC	Aptitude Skills - II	1	-	-	1	25	25	-	-	50	Audit
HMS04	HSMC	Language Skills - II	-	-	2	2	25	25	-	-	50	1
PRJ03	PROJ	Mini Project - III	-	-	2	2	25	25	-	-	50	1
IFT01	PROJ	Industrial Training / Field Training - I	-	-	-	-	25	25	-	-	50	Audit
		Total	**18**	**-**	**10**	**28**	**220**	**220**	**150**	**310**	**900**	**21**

Elective-I

A. Data Structure
B. Micro Electro Mechanical System (MEMS)
C. Computer Architecture
D. Signals and Systems

Department of Electronics & Telecommunication Engineering • YADRAV • sit

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's
Sharad Institute of Technology College of Engineering
(An Autonomous Institute)
Yadrav (Ichalkaranji)-416121, Dist. – Kolhapur

Semester IV

1. Analog And Digital Communication

ET401	PCC	Analog and Digital communication	3-0-0	3 Credits

Teaching scheme:	**Examination Scheme:**
Lecture:3Hrs/week	CA-1 :10Marks CA -2 :10Marks Mid Semester Exam: 30Marks End Semester Exam: 50 Marks

Pre-Requisites: - Fundamental electronics & Fundamental Mathematics

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

CO1	Explain the basic concepts of the analog communication systems.
CO2	Determine modulation index, bandwidth and power requirements for various amplitude modulation schemes..
CO3	Analyze frequency modulation schemes and compare AM, FM, and PM
CO4	Make use of detection methods to perform amplitude and frequency demodulation
CO5	Elaborate different source coding techniques
CO6	Compare various carrier modulation techniques

Department of Electronics & Telecommunication Engineering YADRAV

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Course Contents:

Unit 1: Introduction to Communication System Block schematic of analog communication system, Simplex and duplex systems, Modes of communication: Broadcast and point to point communication, Necessity of modulation, Classification of modulation, sampling theorem and pulse analog modulation, Introduction to multiplexing-TDM, FDM.	[06]
Unit 2: Amplitude Modulation Introduction, Mathematical analysis and expression for AM, Modulation index, Frequency spectrum and bandwidth of AM, Power calculations, Generation of AM using nonlinear property, Low- and high-level modulation, Balance Modulator, Types of AM: DSB-FC, DSB- SC, SSB-SC, ISB and VSB, their generation methods and comparison.	[06]
Unit 3: Angle Modulation Introduction, Mathematical analysis of FM and PM, Modulation index for FM and PM, Frequency spectrum and bandwidth of FM, Narrow band and wide band FM, Direct and indirect methods of FM generation, Pre emphasis and de-emphasis, Comparison of AM, FM and PM.	[06]
Unit 4: AM & FM Detectors AM Detectors: Envelop detector and practical diode detector, FM Detectors: Slope detector, phase discriminator and ratio detector	[06]
Unit 5: Source coding Block schematic of digital communication system, Sampling and Quantization, PCM, DPCM, ADPCM, DM, ADM, CVS	[06]
Unit 6: Carrier Modulation Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), BPSK, DPSK, QPSK, Quadrature Amplitude Modulation (QAM), Bandwidth, efficiency and application, and Comparison of various carrier modulation techniques (ASK – FSK – PSK – QAM).	[06]

Text Books:

1. Kennedy, "Electronics Communications Systems", Mc Graw-Hill NewDelhi-1997, 4th Edition.
2. R. P. Singh, S. D. Sapre, "Communication Systems Analog and Digital", McGraw-Hill New Delhi, 2nd Edition.
3. Anokh Singh, "Principles of communication engineering" S. Chand
4. Wayne Tomasi, "Electronic Communication Systems", Pearson Education-2005, 5th Edition
5. K. Sam Shanmugam, " Digital & Analog Communication" (JohnWiley)
6. Simon Haykin, " Digital Communication" (Wiley)

Reference Books:

1. BernardSklar ,Pabitra Kumar Ray-' Digital Communications'-2nd Edition-Pearson
2. Taub - Schilling –Saha- ' Principals of communication systems' -3rd Edition-Mc GrawHill
3. Lathi B P & Ding Z –' Modern Digital & Analog Communication Systems'-Oxford University Press, Fourth Edition
4. Ha Nguyen Ed Shwedyk-A First Course in Digital Communication – Cambridge Unipress
5. Roddy & Coolen, "Electronic communication" PHI
6. Beasley & Miller, "Modern Electronic Communication", Prentice-Hall India-2006, 8th Edition.

Head of the Department
Electronics & Tele-Comm. Engg
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's

Sharad Institute of Technology College of Engineering

(An Autonomous Institute)

Yadrav (Ichalkaranji)-416121, Dist. – Kolhapur

2. Microprocessor and Microcontroller

ET402	PCC	Microprocessor & Microcontroller	3-0-0	3 Credits

Teaching Scheme:	**Examination Scheme:**
Lecture: 3hrs/week	CA-1 :10Marks CA 2 :10Marks Mid Semester Exam: 30Marks End Semester Exam: 50 Marks

Pre-Requisites: Digital Electronics.

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

CO1	Explain architecture, pin functions and addressing modes of 8085 microprocessor.
CO2	Build simple assembly language programs using 8085 instruction sets.
CO3	Make use of 8085 and 8255 to interface external peripherals.
CO4	Develop assembly language programs for arithmetic & logical operations using 8051
CO5	Develop code in Embedded C to illustrate concepts of serial communication, timers, interrupts and I/O ports.
CO6	Make use of 8051 for interfacing External Peripherals.

Course Contents:

Unit 1: Introduction to 8085 Microprocessor (6 Hrs.) 8085 architecture, Registers, pin functions, De-multiplexing of Address/Data bus, Interrupt Structure & Interrupt Types.	[6]
Unit 2: Programming with 8085 (8 Hrs.) Addressing modes, Instruction set, Stack & Subroutine, Introduction to Timing diagram-T-state, Machine Cycle, Assembly language programming,	[8]
Unit 3: Interfacing with 8085 (6 Hrs.) Memory Interfacing: RAM, ROM, Introduction to 8255, Block Diagram, Pin Diagram, Interfacing and Programming for LED, DC Motor	[6]
Unit 4: 8051 Microcontroller Architecture And Instruction Set (9 Hrs.) Functional block diagram and pin diagram of 8051, Power supply, clock and reset circuit, Program Counter and ROM space in 8051, Program and Data Memory organization, addressing modes, Instruction Set: data transfer, arithmetic and logical, program branching instructions and Boolean variable manipulation	[9]
Unit 5: On-Chip Peripherals And Programming Embedded C Programming: Data Types, Operators Embedded C Programming: Data Conversion, I/O Programming Timer/Counter: Operating Modes, Programming. UART: Operating Modes, Programming. Interrupt: 8051 Interrupt- External and Internal Interrupts.	[7]

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Unit 6: Off-Chip Peripheral Interfacing And Programming Interfacing: LED, Switches and Matrix Keyboard, LCD, ADC 0808 with Analog Sensor, DAC	[6]
Text Books: Ramesh S. Gaonkar- 1. Microprocessors Architecture, Programming and applications with8085A The 8051 Microcontroller & Embedded Systems By Muhammad Ali Mazidi &Janice Gillispie Mazidi Pearson Edition L. P.E.	
Reference Books: Kenneth L Short –'Microprocessors and Programmed logic' Douglas V Hall-'Microprocessors and Digital Systems" The 8051 Microcontroller By Ayala 3-Edition	

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

3. Elective I

ET403	PEC	Elective-I	4-0-0	4 Credits

Teaching Scheme:	**Examination Scheme:**
Lecture: 4hrs/week	CA-1 :10Marks CA 2 :10Marks Mid Semester Exam: 30Marks End Semester Exam: 50 Marks

A. Data Structure

ET403A	PEC	Data Structure	4-0-0	4 Credits

Pre-Requisites: - Basics of C programming.

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

CO1	Understand the basics of data structure and its application.
CO2	Understand concepts of array and records.
CO3	Demonstrate the concepts of Linked List and apply various operations on them.
CO4	Understand concepts of stack and queue.
CO5	Demonstrate the concepts of Trees apply various operations on them.
CO6	Demonstrate Basic terminologies and representation of Graph.

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Course Contents:

UNIT1: Introduction & Overview Introduction to data structures & its data types, Operations, Algorithms: complexity, time space trade-off with example.	[5]
UNIT2: Arrays, Records Introduction, linear arrays, representation of linear array in memory, traversing linear arrays, inserting & deleting, Sorting: bubble sort, searching: linear search, binary search, Multidimensional arrays, Records: Record structures, representation of records in memory, parallel arrays, matrices, sparce matrices.	[8]
UNIT 3 Linked Lists: Introduction, linked lists & its representation, Traversing& searching a linked list, memory allocation, Garbage collection, insertion & deletion of nodes of linked list, header linked list, two-way lists.	[9]
UNIT 4 Stacks & Queues: Introduction to stacks, stack as an Abstract Data type, representation through Arrays & linked lists, Applications of stacks, stacks & recursion, Queue as an abstract data type representation, circular, double ended , priority, Quick sort ,application of queues.	[8]
UNIT 5 Trees: Binary Tree: introduction, types, definition, properties, representations, operations, binary tree traversal, Header nodes; Threads, BST, Advanced trees: AVL trees or height balanced trees, representation operation, Expression trees. Multi way trees: trees, multi way search trees, B trees, Heaps, construction of a Heap.	[10]
UNIT6 Graph: Introduction, Graph theory terminology, sequential representation of graphs: Adjacency Matrix, Path matrix, Warshall's Algorithm, shortest paths, linked representation. Operations, Traversing, Posets, Topological sorting.	[8]

Reference Books:

1. S. Lipschutz, Data Structures, McGraw-Hill Publication, Revised Edition.
2. Thomas Cormen, Introduction to Algorithms, PHI Publication, 2nd Edition, 2002.
3. E. Horowitz, S. Sahani, Fundamentals of Data Structures, Galgotia Publication, 1st Edition,1983.
4. Kyle Loudon, Mastering Algorithms with C: Useful Techniques from Sorting to Encryption, O'Reilly Media, 1st Edition, 1999
5. Mark Allen Weiss, Data structures and algorithms analysis in C++, Pearson Education, 4thEdition, 2013.
6. Y. Langsm, M. Augenstin, A. Tanenbaum, Data Structure using C and C++, Prentice Hall India Learning Private Limited, 2nd Edition, 1998.
7. Trembley and Sorenson, Introduction to Data Structures, PHI Publication, 2nd Revised Edition, 1983.

Department of Electronics & Telecommunication Engineering YADRAV

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's
Sharad Institute of Technology College of Engineering
(An Autonomous Institute)
Yadrav (Ichalkaranji)-416121, Dist. – Kolhapur

B. Micro Electro Mechanical System

ET403B	PEC	Micro Electro Mechanical System	4-0-0	4 Credits

Pre-Requisites: - Fundamental electronics & Fundamental Mathematics
Course Outcomes: At the end of the course, students will be able to:

CO1	Explain basic concept of MEMS & small system.
CO2	Classify different smart materials.
CO3	Categorize different types of Transducers, Actuators & Sensors.
CO4	Explain basic fabrication steps
CO5	Determine the Micro molding of polymeric 3D structure & Polymeric process
CO6	Summarize basic mechanics of laws MEMS/NEMS energy methods.

Course Contents:

Unit 1: Control and Materials of MEMS Introduction, Concepts of MEMS: Processes Principles, application and design, Scaling Properties/Issues, Ceramics, Polymers and their synthesis. Micromachining Substrates, lithography, wet/dry etching processes Mechanical Transducers: accelerometers, Pressure sensors, MEMS microphones.	[8]
Unit 2: Smart Materials and Systems: Materials for MEMS Substrate, silicon, Silicon compound, Silicon pezoresisters, Gallium arsenide, Quartz, piezoelectric crystals, Polymers. Thermo responsive Materials, Piezoelectric Materials, Electrostrictive Management Materials, Rheological Materials	[8]
Unit 3: Transducers, Sensors and Actuators: Introduction, Principles of sensing and actuation. Beam and Cantilever, Micro plates, capacitive effects, MEMS Gyroscopes. Chemical and Biological Transducers: basic concepts of cellular biology, chemical sensors, molecule-based biosensors, Cell-based biosensors.	[8]
Unit 4: Basic MEMS fabrication modules MEMS fabrication modules Oxidation, Deposition Techniques, Lithography (LIGA), Etching Micromachining, Surface Micromachining, Bulk Micromachining, Isotropic Etching and Anisotropic Etching, Wafer Bonding.	[8]
Unit 5: Polymeric Fabrication Techniques Microsteriolothography Introduction, MSL by scanning method, Micro molding of polymeric 3D structure: Micro molding of polymeric 3D structure: Micro-injection molding Micro-injection molding Micro- photo [illegible]	[8]

Head of the Department
Electronics & Tele-Comm. Engg
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Unit 6: Mechanics of solids in MEMS/NEMS Mechanics of solids in MEMS/NEMS Strain, Stress law, Hooks' law Poisson effect Linear Thermal Expansion Bending, Energy methods	[8]

Text Books:

1. Nitaigour Premchand Mahalik "MEMS" McGraw-Hill.

Reference Books:

1. 1. G. K. Anantha suresh, K. J. Vinoy, S. Gopal krishnan K. N. Bhatt, V. K. Aatre, Micro and Smart Systems, Wiley India,2012.
2. S. E. Lyshevski, Nano-and Micro-Electromechanical systems: Fundamentals of Nano-and Micro engineering (Vol. 8). CRC press,(2005).
3. S. D. Senturia, Microsystems Design, Kluwer Academic Publishers,2001.
4. M. Madou, Fundamentals of Micro fabrication, CRC Press,1997.
5. G. Kovacs, Micro machined Transducers Sourcebook, McGraw-Hill, Boston,1998.
6. M.H. Bao, Micromechanical Transducers: Pressure sensors, accelerometers,and Gyroscopes, Elsevier, New York,2000.

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

C. Computer architecture

ET403C	PEC	Computer Architecture	4-0-0	4 Credits

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

CO1	Explain the basic organization of a computer system.
CO2	Recognize and manipulate representations of numbers stored in digital computers
CO3	Explain different ways of accessing an input / output device including interrupts.
CO4	Illustrate the organization of different types of semiconductor and other secondary storage memories.
CO5	Illustrate simple processor organization based on hardwired control and micro programmed control
CO6	Explain pipelining and parallel processing.

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Department of Electronics & Telecommunication Engineering • YADRAV •

Unit 1Basic Structure of Computers: Computer Types, Functional Units, Basic Operational Concepts, Bus Structures, Software, Performance – Processor Clock, Basic Performance Equation	[8]
Unit 2Machine Instructions and Programs: Numbers, Arithmetic Operations and Characters, IEEE standard for Floating point Numbers, Memory Location and Addresses, Memory Operations, Instructions and Instruction SequencingAddressing ModesAssembly Language, Basic Input and Output Operations, Stacks and Queues, Subroutines, Additional Instruction.	[8]
Unit 3Input/Output Organization: Accessing I/O Devices, Program controlled I/O Interrupts – Interrupt Hardware, Enabling and Disabling Interrupts, Handling Multiple Devices, Controlling Device Requests, Direct Memory Access, I/O Interface circuits, Standard Input/ Output Interfaces	[8]
Unit 4Memory System: Basic Concepts, Semiconductor RAM Memories-Internal organization of memory chips, Static memories, Asynchronous DRAMS, Read Only Memories, Cash Memories, Virtual Memories, Secondary Storage	[8]
Unit 5Basic Processing Unit: Some Fundamental Concepts, Single bus organization, Execution of a Complete Instruction, Multiple Bus Organization, Hardwired Control, Micro programmed Control	[8]
Unit 6Pipelining: Basic concepts of pipelining, pipelining in Computers, pipelining performance, data path and control logic, Forms of parallel processing.	[8]
Text Books 1. Carl Hamacher, ZvonkoVranesic, SafwatZaky: Computer Organization, 5th Edition, Tata McGraw Hill, 2002. 2. L. Krishnananda: Computer Organization 2nd edition, Prism Books,2013	
Reference Books: 1. David A. Patterson, John L. Hennessy: Computer Organization and Design – The Hardware / Software Interface ARM Edition, 4th Edition, Elsevier, 2009. 2. William Stallings: Computer Organization & Architecture, 7th Edition, PHI, 2006. 3. VincentP. Heuring& Harry F. Jordan: Computer Systems Design and Architecture, 2nd Edition, Pearson Education, 2004.	

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's
Sharad Institute of Technology College of Engineering
(An Autonomous Institute)
Yadrav (Ichalkaranji)-416121, Dist. – Kolhapur

D. Signals and Systems

ET403D	PEC	Signals and Systems	4-0-0	4 Credits

Pre-Requisites : Engineering

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

CO1	Classify signals and perform signal transformation
CO2	Solve convolution integral and convolution sum to analyze LTI systems.
CO3	Determine fourier series coefficients represent in trigonometric and exponentialform
CO4	State and prove properties of DTFT
CO5	Determine ZT and IZT
CO6	Apply Laplace transform to analyze signals

Course Contents:

Unit 1: Continuous & Discrete Time Signals: Classification of (CT/DT) signals – Even and odd, Periodic and Aperiodic, Energy and Power signals, Deterministic and Random signals, periodic signal, operations on signals, Impulse function, Interconnection of systems and system properties	[8]
Unit 2:Analysis of Linear Time-Invariant Systems LTI systems: impulse response, convolution integral, Convolution sum, properties of LTI systems, LTI Systems described by differential equations, difference equations, Realization of systems(Directform1,2)	[8]
Unit 3:Fourier series &Fourier Transform Fourier series representation of periodic signal, Trigonometric Fourier series (FS),Exponential FS, Properties of FS, The continuous-time,(FT) Fourier transform, FT of a periodic signals, Properties ofFT.	[8]
Unit 4:Fourier representation of Discrete-Time signals DT Fourier Series (DFTS), Properties of DTFS, DT Fourier Transform(DTFT), Properties of DTFT, Problems, Applications of FT and DTFT.	[6]
Unit 5:Z-Tansform Unilateral Z-transform(UZT) (ROC) Region of Convergence and its properties, Inverse Z- transform(IZT), Geometric evaluation of the ZT from the pole-zero plot, Properties of ZT, Analysis and characterization of LTI systems using ZT, Unilateral Z-transform(UZT).	[10]
Unit 6: Laplace Transform	[8]

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Laplace-Transform (LT), ROC- Region of Convergence and its properties, Inverse L-transform (ILT), Properties of LT, Problems Analysis and characterization of systems	
Textbooks: 1. Ramesh Babu,R. Anandanatarajan," Signals and Systems", Scitech publication, Fifth edition 2. Allan V.Oppenheim, S.Wilsky and S.H.Nawab, "Signals and Systems", Pearson Education, 2007. 3. B.P.Lathi,"Linear Systems and Signals ".Oxford University Press,2005.	
Reference Books: 1. Simon Haykin and Barry Van Veen "Signals and Systems", John Wiley & Sons,2001 2. Miichael J Roberts, Govind Sharma, "Fundamentals of Signals and Systems",2nd Edition, Mc GrawHill 2010	

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Department of Electronics & Telecommunication Engineering • YADRAV •

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's
Sharad Institute of Technology College of Engineering
(An Autonomous Institute)
Yadrav (Ichalkaranji)-416121, Dist. – Kolhapur

4. Linear Integrated Circuits

ET404	PCC	Linear Integrated Circuits	3-0-0	3 Credits

Teaching Scheme:	**Examination Scheme:**
Lecture: 3 hrs/week	CA-1 :10Marks CA 2 :10Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Basic Electronics & Analog Circuit

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

CO1	Explain the characteristics of IC & op-amp parameters
CO2	Design linear and non linear applications using op-amp
CO3	Compare different active filters using op-amp
CO4	Make use of op-amp to test various oscillators using op-amp
CO5	Relate and Implement different converters using op-amp

Course Contents:

Unit I Introduction to op-amp Block diagram of OP-AMP, Explanations of each block, Differential Amplifier configurations, Differential amplifier analysis (AC & DC) for dual-input balanced-output configuration using 'r' parameters, level shifter, current mirror circuits, Op-Amp parameters. OP-AMP configurations, Data Sheets – µA 741, OP 177, LM 324, LM 311, LM 308, LM380 Study of TL082Op-Amp.	[6]
Unit II Applications o fop-amp Summing, Scaling & Averaging Amplifiers using Op-amps, Differential amplifier using op-amp, Subtractor Circuit, Instrumentation amplifier to I & I to V Converter, Precision Rectifiers, and Study of comparator, Schmitt Trigger, Clippers & Clampers, Peak Detectors.	[6]
Unit III Active Filters Introduction, Analysis & Design of Butterworth filters: High Pass filter, Low Pass filter (First & Second order), Band Pass filter, Band Reject filter, All Pass Filter, Introduction to Chebyshev Filter.	[6]
Unit IV Waveform Generators Analysis & Design of Square wave generator, Triangular wave generator, Sawtooth wave generator. Analysis & Design of RC phase shift oscillator, RC wein-bridge oscillator, Colpitts oscillator, Hartley oscillator.	[6]

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Unit V Special purpose ICs IC 555 Timer: Block Diagram, Operating Principle, Multi-vibrator using IC 555. IC 565 PLL: Operating Principles, applications, Introduction of (block diagram, features, and application areas): IC OP177 op-amp, TL082 Texas Instruments Op-amp, IC AD620 instrumentation amplifier.	[6]
Unit VI System Design Using Op-amp Analog to digital Converter, Digital to analog Converter, voltage to frequency converter, On off controller, proportional controller	[6]

Text Books:

Ramakant A. Gaikwad, "Op Amps and Linear Integrated Circuits", Pearson Education second and latest edition

Reference Books:

1. Robert Coughlin, Fredric Driscoll, "Operational Amplifiers and Linear Integrated Circuits", Sixth edition, PE, 2006.
2. David Bell, "Operational Amplifiers and Linear ICs", Thirded , Oxford University Press\
3. B. Somanathan Nair, "Linear Integrated Circuits- Analysis, Design & Applications", Wiley India.
4. T.R Ganesh Babu, "Linear Integrated Circuits" 3rd Edition, Scitech Publication
5. David. A. John & Ken Martin "Analog Integrated Circuit Design", Student Edition, Wiley
6. Sergio Franco "Design with op-amp & Analog Integrated Circuits" , 3rd Edition, Tata McGraw Hill.
7. Sergio Franco "Design with op-amp & Analog Integrated Circuits", 3rd Edition, Tata McGraw Hill.
8. S. Salivahanan & Bhaaskaran "Linear Integrated Circuits", 1st Edition, Tata McGraw Hill.

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's
Sharad Institute of Technology College of Engineering
(An Autonomous Institute)
Yadrav (Ichalkaranji)-416121, Dist. – Kolhapur

5. Numerical Methods

ET405	BSC	Numerical Methods	3-0-0	3 Credits

Teaching Scheme:	**Examination Scheme:**
Lecture: 3 hrs/week	CA-1 :10Marks CA 2 :10Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Engineering Mathematics-I & II

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

CO1	Solve the system of simultaneous linear equations by direct & iterative methods.
CO2	Solve the algebraic and transcendental equations by numerical techniques and explain the concept of error and solve the problems related to errors.
CO3	Apply various interpolation methods and finite difference concepts.
CO4	Apply numerical integration techniques whenever and wherever routine methods are not applicable.
CO5	Develop basic mathematical tools for fitting of curves like linear and non-linear curve and regression.
CO6	Apply discrete and continuous probability distributions to various engineering problems.

Course Contents:

Unit 1: Solution of Simultaneous linear Equations Gauss elimination method, Gauss-Jordan method, Iterative method of solution- Jacobi iteration method, Gauss-Seidal iteration method, Relaxation method, Determination of Eigen values by iteration.	[6]
Unit 2: Numerical solution of transcendental & algebraic equations and Errors Solution of Algebraic and Transcendental Equation: Bisection method, Method of false position, Newton's method and Newton-Raphson method. **Errors:** Introduction, Types of errors; Rules for estimate errors; Error propagation; Error in the approximation of function.	[8]
Unit3:Interpolation Finitedifferences:interpolation/extrapolationusingNewton'sforwardandbackwarddifference formulae, Newton's divided difference and Lagrange's formulae (All formulae	[6]

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

withoutproof).	
Unit 4:Numerical Integration Trapezoidal rule, Simpson's (1/3) th rule, Simpson's (3/8) th rule and Weddle's rule (without proof).Problems.	[4]
Unit 5: Curve Fitting Lines of regression of bivariate data, Fitting of Curves by method of Least-squares-Fitting of Straight lines, Fitting of Parabola & Fitting of exponential curves.	[6]
Unit 6:ProbabilityDistributions Random variable, Probability mass function, Probability density function Binomial distribution, Poisson distribution &Normal distribution.	[6]

Text books:

1. P. N. Wartikar& J. N. Wartikar, A Text Book of Applied Mathematics (Vol I & II),Pune Vidyarthi GrihaPrakashan,Pune.

2. N. P. Bali, A Text Book of Engineering Mathematics, Laxmi Publications, NewDelhi.

3. Peter O" Neil, A Text Book of Engineering Mathematics, Thomson AsiaPvt. Ltd., Singapore.

4. E.Balagurusamy, "Numerical Methods", TataMcGraw HillPublications,1999.

Reference books:

1. B. S. Grewal, Higher Engineering Mathematics, KhannaPublishers.

2. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley &Sons.

3. B. V. Ramana, Higher Engineering Mathematics, McGraw-Hill Publications, NewDelhi.

4. C. R. Wylie & L. C. Barrett. Advanced Engineering Mathematics, McGraw HillPublishing CompanyLtd.

5. S. S. Sastry, "Introductory Methods of Numerical Analysis", PHI, 1990, 3rdedition.

6. K. E. Atkinson, "An Introduction to NumericalAnalysis",Wiley,1978

7. M.J. Maron, "Numerical Analysis: A Practical Approach", Macmillan, New York,1982

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

6. Analog and Digital Communication Laboratory

ET406	PCC	Analog and Digital Communication Laboratory	0-0-2	1 Credits

Teaching Scheme:	**Examination Scheme:**
Practical: 2 hrs./week	CA1-15 Marks CA2-15 Marks End Semester Exam-20 Marks

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

CO1	Measure various parameters of AM & FM signals
CO2	Illustrate sampling Techniques
CO3	Explain Multiplexing & De multiplexing
CO4	Experiment with the different digital modulation techniques

Experiment list: - Any 10 experiment from given list

Expt.No	Name of the Experiment
1.	To study Amplitude modulation and Demodulation
2.	To Study DSB modulation andDemodulation
3.	To Study SSB modulation andDemodulation
4.	To Study Frequency Modulation andDemodulation
5.	To Study Natural Flat top sampling andreconstruction
6.	To Study PWM modulation andDemodulation
7.	To Study PPM modulation andDemodulation
8.	To Study Amplitude ShiftKeying
9.	To Study Frequency shiftkeying
10.	To Study Binary ShiftKeying
11.	To Study Quadrature Shift Keying
12.	To Study AMReceiver

Department of Electronics & Telecommunication Engineering SIT YADRAV

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

7. Microprocessor and Microcontroller Laboratory

ET407	PCC	Microprocessor and Microcontroller Laboratory	0-0-2	1 Credits

Teaching Scheme:	**Examination Scheme:**
Practical: 2 hrs./week	CA1-15 Marks CA2-15 Marks End Semester Exam -20Marks

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

CO1	Make use of 8085 instructions to build simple assembly language programs.
CO2	Apply features of 8255 to interface LEDs.
CO3	Develop assembly & Embedded C language programs to interface external devices to

Experiment List:

Expt No	Name of Experiment
1.	Addition & Subtraction using 8085Microprocessor.
2.	Multiplication & Division using 8085Microprocessor.
3.	Block transfer & block exchange using 8085Microprocessor.
4.	I/O Mode & BSR Mode of8255.
5.	Waveform generation using DAC0808, 8255 & 8085Microprocessor.
6.	Arithmetic and Logical operations using 8051Microcontroller.
7.	LEDs Interfacing to 8051 Microcontroller with TimerInterrupt.
8.	LCD Interfacing to 8051Microcontroller.
9.	Keyboard Interfacing to 8051Microcontroller.
10.	Stepper Motor Interfacing to 8051Microcontroller.

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

8. Linear Integrated Circuits Laboratory

ET408	PCC	Linear Integrated Circuits Laboratory	0-0-2	1 Credits

Teaching Scheme:	**Examination Scheme:**
Practical: 2 hrs./week	CA1-15Marks CA2-15 Marks End Semester Exam -20Marks

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

CO1	Select an appropriate op-amp for a particular application by referring data sheet.
CO2	Analyze feedback and its effect on the performance of op-amp.
CO3	Design, build & test linear & Non-linear circuits.
CO4	Experiment with various waveform generators using op-amp.
CO5	Design &Analyze active filters using op-amp.

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's
Sharad Institute of Technology College of Engineering
(An Autonomous Institute)
Yadrav (Ichalkaranji)-416121, Dist. – Kolhapur

List of Experiments:

(Minimum 10 experiments should be conducted out of which maximum 2 can be Simulation based)

Expt No.	Name of the Experiment
1	Measure op-amp parameters and compare with the specifications. (a) Measure input bias current, input offset current and input offset voltage. (b) Measure slew rate (LM/UA741C andLF356) (c) Measure CMRR (d) Compare the result with datasheet of corresponding Op Amp.
2	Design of Summing, scaling, and averaging amplifier.
3	Design of V to I convertor
4	Design, build and test differentiator and integrator
5	Design, build and test precision half & full wave rectifier.
6	Design, build and test Comparator and Schmitt trigger.
7	Design, build and test Sample and hold circuit
8	Design of Butterworth filters
9	Design, build and test PLL and any one application a) Study PLL IC565. b) Find the free running frequency. c) Find lock range and capture range.
10	Design, build and test square & triangular wave generator.
11	Design of astable & mono-stable multivibrators usingIC555
12	Design and implement Wien bridge oscillator using Op-Amp.
13	An application of AD620 instrumentation amplifier.
14	Design, build and test window detector.
15	Design On Off Controller/proportional Controller.

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

9. Constitution of India

MDC01	MC	Constitution of India	1-0-0	Audit

Teaching Scheme:	**Examination Scheme:**
Lecture:--1hr/week	CA-1:25Marks CA-2:25Marks

Pre-Requisites: Nil
Course Outcome: At the end of the course students will be able to

CO1	Define the meaning and features of Indian constitution.
CO2	Interpret right to life and fundamental rights to certain free document underarticle19and21.
CO3	Outline the federal structure of power and directive principles of state policy.

Course contents

Unit1: Meaning of the constitutional and constitutionalism, Historical perspective of the Constitution of India.	[2]
Unit2: SalientfeaturesandcharacteristicsoftheConstitutionofIndia,Schemeofthefundamentalrights ,The scheme of the Fundamental Duties and its legal status	[2]
Unit3: The Directive Principles of State Policy – Its importance and implementation, Federal structure and distribution of legislative and financial powers between the Union and the States, Parliamentary Form of Government in India– The constitution powers and status of the President of India	[2]
Unit4: Amendment of the Constitutional Powers and Procedure, The historical perspectives of the constitutional amendments in India, Emergency Provisions: National Emergency, President Rule, Financial Emergency	[2]
Unit5: Local Self Government – Constitutional Scheme in India, Scheme of the Fundamental Right to Equality	[2]
Unit6: Scheme of the Fundamental Right to certain Freedom under Article 19, Scope of the Right to Life and PersonalLibertyunderArticle21.	[2]

Department of Electronics & Telecommunication Engineering SIT YADRAV

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Books:

1. Constitution of India Published by Government of India Ministry of Law and Justice(Legislative Department), 2020
2. Textbook on The Constitution of India by S R Bhansali
3. Constitution of India by Bakshi P M.January2014

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

10. Aptitude Skills –II

HMS03	HSMC	Aptitude Skills-II	1-0-0	Audit

Teaching Scheme:	**Examination Scheme:**
Lecture:1hr/week	CA1:25Marks CA2:25Marks

Pre-Requisites: Communication Skills, Aptitude Skills- I

Verbal Ability (12Hrs) (Compulsory)

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

CO1	Understand basic concepts of sentences and its structure
CO2	Understand the tenses and its use in daily life
CO3	Explain basic uses of speeches and voices in day to day life
CO4	Understand the use of modal verbs in sentence construction
CO5	Summarize various Phrases, Idiom sand Proverbs
CO6	Summarize different words used in daily life

Unit1:EnglishGrammar Structure and Types of Sentence ,Conditional Sentences	[2]
Unit2:Tenses Present tense, Past tense ,Future tense ,Use of Tenses in Sentence forming	[2]
Unit3:SpeechesandVoices Direct and Indirect Speech, Active and Passive Voice	[2]
Unit4:Modal Use of Modal verbs in Sentence Forming, Substitution and Elimination	[2]
Unit5:Proverbs,Idioms and Phrases Use of Proverbs, Idioms and Phrases in Sentence Construction, Judgment and Inference Sentence	[2]
Unit6:Vocabulary Vocabulary Building in Various Situations	[2]

Text Books:

1. Raymond Murphy, Essential English Grammar with Answers, Murphy
2. Objective General English by R.S. Aggarwal , S Chand Publishing; Revised edition (15March2017)

Reference Books:

1. Rao N, D, V, Prasada, Wren & Martin High School English Grammar and Composition Book, S Chand Publishing, 2017
2. Murphy, Intermediate English Grammar with Answers, Cambridge University Press; Second edition

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

11. Language Skills-II

HMS04	HSMC	Language Skills- II	0-0-2	1 Credit

Teaching Scheme:	**Examination Scheme:**
Practical:2hrs/week	CA1:25Marks CA2:25Marks

Pre-Requisites: Communication Skills, Language Skills-I

Languages (Any One)

C Programming (Technical Language) (24Hrs)

Syllabus for C Programming

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

CO1	Illustrate the concept of Function Types ,and its type
CO2	Make use of Structures and Unions.
CO3	Make use of Pointers
CO4	Illustrate the concept of File handling in C programming.

Unit1:Function Editing, Basic of functions, Types of functions, returning non-integers external variables, scope rules, Recursion Function.	[6]
Unit2:StructuresandUnions Variable Defining a Structure, Advantage of Structure, Size of Structure, Arrays of Structures, Structures and Functions, Defining Unions.	[6]
Unit3:Pointers Pointers to integers, characters, floats, arrays, structures.	[6]
Unit4:Filehandling InitializingIntroductiontodynamicmemoryallocation-Malloc,Calloc,Realloc,Introductiontofilemanagement,Opening/Closingafile,Input/Outputoperationson, Files, Error handling during I/O Operations.	[6]

Text Books

1. C Programming AbsoluteBeginner'sGuide,QuePublishing;3rdedition(22August2013)
2. C Programming Language 2ndEdition,PearsonPublication

Reference Books

1. C:TheComplete Reference, Hill Education; 4th edition (1July2017)
2. CProgrammingineasysteps,5th Edition,In Easy Steps Limited
3. TheCProgrammingLanguage,SecondEdition,ByPearsonEducationIndia(1January2015)

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Foreign Languages (Any One)Japanese Language Course I(12Hrs)

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

CO1	Converse in Standard Japanese to perform basic communicative tasks (e.g., exchange greetings/personal information, give time/directions/daily activities)
CO2	Make use of Japanese vocabulary effectively.
CO3	Demonstrate reading comprehension.

Course Contents:

Unit1:Basiccommunicativetasks Learning expressions involving gaimasu‖ pattern, Introduction of counters, simple translations, Communicative situations—shopping, Grammar: Introduction of adjectives, na-adjectives	[4]
Unit2:Communicativesituations Time relation, Communicative situations-confirming schedules etc, Particles and their functional use in Japanese sentences, Reading comprehension a story	[4]
Unit3:Easyconversation Introductionofpasttenseaspectinr/overbs,andadjectives,Communicativesituation:askingquestionsandanswering, Easy conversation, Overall revision, and discussion	[4]

Text Book:

1. NetzwerkArbetisbuchA1Goyal Publisher.
2. TheEverythingLearningGermanBook:SpeakWriteandUnderstandBasicGermanin No Time by Ed Swick
3. GermanMadeSimple:LearntoSpeakandUnderstandGermanQuicklyandEasily‖by Eugene Jackson and Adolph Geiger

ReferenceBooks

1. Hammer's German Grammar and Usage (Fifth Edition) by Professor Martin Durrell
2. Learn German with Stories: Café‖in Berlin‖ by André Klein

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Department of Electronics & Telecommunication Engineering YADRAV

ForeignLanguagesGerman

Language CourseI(12Hrs)

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

CO1	Introduce herself for himself in German.
CO2	Understand alphabets, numbers in German language
CO3	Make basic and easy sentences required in day to day situations
CO4	Read, write, speak and listen basic and simple text in German.

Unit1:Introduceoneself Introduction,Greetings.GermanAlphabets,Numbers(1-100),GivingandaskingInformationrelated to numbers	[3]
Unit2:Formal and Informal form Difference between Formal and Informal form, ,verb conjugation	[3]
Unit3:Everyday situations Learningaboutthethingsintheclassroom,Definite,indefinite,negativearticles,PossessiveArticles of all the nouns	[3]
Unit4:Simple activities Watch timings learning. Routine activities	[3]
Text Books 1. NetzwerkArbetisbuchA1GoyalPublisher 2. -The Everything Learning German Book: Speak, Write and Understand Basic German in No Time by Ed Swick 3. -German Made Simple: Learn to Speak and Understand German Quickly and Easily‖ byEugene Jackson and AdolphGeiger	
Reference Books 1. -Hammer's German Grammar and Usage‖(Fifth Edition) by Professor Martin Durrell 2. -Learn German with Stories: Caféin Berlin‖ byAndré Klein	

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Department of Electronics & Telecommunication Engineering YADRAV

12. Mini Project-III

PRJ03	PROJ	Mini Project-III	0-0-2	1Credit

Teaching Scheme:	**Examination Scheme:**
Practical:2hr/week	CA1:25Marks CA2:25Marks

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

CO1	Develop software and Hardware skills.
CO2	Improve technical knowledge, Team Building, communication and management.

Instructions:

Students have to submit a report to the respective guide and demonstrate the mini project forth evaluation. Students have to carry out one mini project in a group of maximum four students.

Head of the Department
Electronics & Tele-Comm. Engg.
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Department of Electronics & Telecommunication Engineering YADRAV

Industrial Training/Field Training

IFT01	PROJ	Industrial training/Field training	0-0-0	Audit

Teaching Scheme:	**Examination Scheme:**
Lecture: -- Tutorial: -- Practical:--	CA1:25Marks CA2:25Marks

Course Outcomes: Students will be able to

CO1	Examine actual working environment
CO2	Demonstrate the use interpretation and application of an appropriate engineering standard in a specific situation.
CO3	Identify sources of hazards, and assess/identify appropriate health &safety measures.
CO4	Summarize technical documents and give presentations related to the work completed.

Instruction:
Students are expected to undergo industrial training for at least four weeks after II semester. Training session shall be guided and certified by qualified engineer/industry expert. Students should prepare detailed report on activities carried out during training. Evaluation shall be based on report and power point presentation.

Head of the Department
Electronics & Tele-Comm. Engg
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur