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SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	Th	T	P	CREDITS
DTEI601		VLSI and VHDL	60	20	20	30	20	2	1	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. Design low power and improved performance VLSI architectures and implement them on FPGA platforms.
2. Communicate effectively and convey ideas using innovative engineering tools.
3. Model passive and active devices suiting advances in IC fabrication technology.

Course Outcomes (COs):

The students will be able to

1. Understand the advances in the VLSI technologies
2. Identify design requirements of analog and mixed signal circuits
3. Perform all design functions using EDA tools.
4. Specify appropriate physical design automation algorithm meeting system requirements.
5. Develop efficient architectures for improving system performance in terms of speed, power consumption, and accuracy.
6. Differentiate sequential language and concurrent language

Syllabus

Unit-I **6hr**

Introduction to CMOS circuit, Circuit & System representation Behavioral representation, structural representation. Physical representation MOS transistor theory. NMOS and PMOS enhancement transistor. Threshold voltage, body effect.

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Unit –II **6hr**

The complementary CMOS inverter-DC character, Static load MOS inverters. Review of silicon semiconductor technology and basic CMOS technology-n-well and p-well process. Interconnect and circuit Twin-tub process layout design rules and latch-up, latch-up triggering and prevention, Clean room.

Unit-III **7hr**

Introduction: About VHDL, Design Flows & EDA Tools, Code Structure, Data types, Operators and Attributes: Operators, Attributes, User-Defined Attributes, Operator, overloading

Unit-IV **6hr**

CMOS design methods. Design strategies. Programmable logic, programmable logic structure, reprogrammable gate arrays. Exiling programmable gate array. Algotonix, concurrent logic, sea of gate and gate array design. Memory: Introduction, Semiconductor Memories.

Unit –V **6hr**

Static and Dynamic CMOS design- Domino and NORA logic – combinational and sequential circuits, Method of Logical Effort for transistor sizing –power consumption in CMOS gates- Low power CMOS design, Arithmetic circuits in CMOS VLSI,introduction to FPGA

List of Experiments

1. Introduction to programmable devices (FPGA, CPLD), Hardware Description Language (VHDL), and the use programming tool.
2. Implementation of basic logic gates and its testing.
3. Implementation of adder circuits and its testing.
4. Implementation 4 to 1 multiplexer and its testing.
5. Implementation of 3 to 8 decoder and its testing.
6. Implementation of 8 to 3 priority encoder and its testing.
7. Implementation of BCD counter and its testing.
8. Implementation of two 8-bit multiplier circuit and its testing.
9. Simulation of CMOS Inverter using SPICE for transfer characteristic.
10. Simulation and verification of two input CMOS NOR gate using SPICE.

Text Book

1. Jan M Rabaey, Digital Integrated Circuits, 2nd Edition, Pearson Education, 2003.
2. Sung-Mo Kang, CMOS Digital Integrated Circuits, 3rd Edition, McGraw-Hill, 2003.
3.Volnei A. Pedroni, Circuit Design and Simulation with VHDL, 2nd Edition, MIT Press, 2010.

References:

1. Neil, H.E. Waste, Kamran Eshraghian, Principles of CMOS VLSI design, Pearson Education.2010
2. Wyne Wolf, System-on-Chip Design, Pearson Education 2002
4. Brown and Vranesic Fundamentals of Digital Logic Design with VHDL, 2009

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SUBJECT CODE	CAEGORY	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			END SEM UNIVERSITY EXAM	TWO TERM EXAM	TEACHERS ASSESSMENT	END SEM UNIVERSITY EXAM	TEACHERS ASSESSMENT	Th	T	P	CREDITS
DTEI602		Industrial Management & Entrepreneurship	60	20	20	0	0	2	1	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Education Objective (CEOs):

1. Gain a complete understanding of all the building blocks of business
2. Learn frameworks to develop and assess business ideas/opportunities
3. Demonstrate the impact of entrepreneurship on the economy and the support from Government and financial institutions.
4. to understand the role of Small Scale Industries and the Institutional support received by them.

Course Outcomes (COs):

After a successfully completed course, the student should be able to:

1. Explain how strategic planning, management, entrepreneurship, organisation, production and learning works in an industrial company,
2. Plan and implement projects applying management techniques.
3. Analyse the role of entrepreneurs in the development of a country and the needed capabilities of an entrepreneurs.
4. Understand the role of small scale industries and the institutional support provided by various organisations for business.

UNIT-I **6hr**

MANAGEMENT:- Characteristics of Management, Nature of Management, Management Functions or The Process of Management, Functional Areas of Management, Management and Administration, Role of Management, Levels of Management, Evolution of Management

UNIT-II **7hr**

PLANNING:- Nature of Planning, Importance of Planning, Types of Planning, Types of Plans, Steps in Planning, Decision-making.

ORGANIZING AND STAFFING :- Definitions of Organizing, Organization Structure, Purpose of Organization, Principles of Organization, Departmentation, Types of Organization, Span of Control, Authority, Power and Responsibility, Delegation of Authority, Centralization and Decentralization, Delegation vs Decentralization, Management by Objectives [MBO], Meaning of Staffing, Nature and Importance of Staffing.

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UNIT-III **6hr**

DIRECTING AND CONTROLLING:- Meaning and Nature of Direction, Principles of Directing, Leadership and Leadership Styles, Motivation, Communication, Noise and Feedback in Communication, Importance of Communication, Channels of Communication, Types of Communication, Coordination, Coordination and Cooperation, .

UNIT-IV **6hr**

ENTREPRENEURSHIP:- Evolution of Concept of Entrepreneur, Concept of Entrepreneur, Characteristics of Entrepreneur, Distinction between Entrepreneur and Manager, Technical Entrepreneur, Functions of an Entrepreneur, Types of Entrepreneur, Entrepreneurship and Entrepreneurship, Concept of Entrepreneurship, Evolution of Entrepreneurship, Role of Entrepreneurship in Economic Development, Stages in the Entrepreneurial Process, Barriers to Entrepreneurship.

UNIT-V **6hr**

LEGAL ISSUES FOR THE ENTREPRENEUR: - IPR, Patents, Trademarks, Copyrights, Trade Secrets, Licensing, Product Safety and Liability, Insurance, Contracts, Advertising, Supply Chain Management, Retail & FDI

INDUSTRY SIZE & CURRENT SCHEMES:- Micro, Small, Medium- Industry, Registration Process, State & National Level Support agencies for a) Information b) Finance c) Technology d) Training e) Quality control f) Marketing, Current Promotional Schemes for new Enterprise

Text Books:

1. Industrial Engineering and Management by O.P.Khanna; Dhanpat Rai and Sons, Delhi
2. Industrial Management by C.L. Mahajan; Saluja Parkashan, New Delhi.
3. Handbook of Small Scale Industry by P.M. Bhandari.
4.

Reference Books:

1. Industrial Organization and Management by Tara Chand; Nem Chand and Brothers; Roorkee.
2. Marketing Management by Phillip Kotler; Prentice Hall of India, New Delhi
3. Environmental and Pollution Awareness by BR Sharma; Satya Prakashan, New Delhi.
4. Industrial Organisation and Engineering Economics by Banga and Sharma; Khanna Publishers, Delhi.
5. Management by Jams A Stoner, R Edward Freman and Daniel R. Gilbrat, JR, Sixth Edition, Pearson Education, New Delhi
6. Industrial Management by VK Sharma, OP Harkut
7. Thakur Kailash, Environment Protection Law & Policy in India: Deep & Deep publication, New Delhi.
8. Principles of Management by Philip Kotler, TEE Publication.

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			THEORY			PRACTICAL					
			END SEM UNIVERSITY EXAM	TWO TERM EXAM	TEACHERS ASSESSMENT	END SEM UNIVERSITY EXAM	TEACHERS ASSESSMENT	Th	T	P	CREDITS
DTEI603		**Biomedical Instrumentation**	60	20	20	30	20	2	1	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objective:

5. It gives the introductory idea about human physiology system which is very important with respect to design consideration
6. With widespread use and requirements of medical instruments, knowledge of the principle of operation of biomedical instruments.
7. It attempts to render a broad and modern account of biomedical instruments.

Course Outcome:

5. Students will have a clear knowledge about human physiology system.
6. They will have knowledge of the principle operation of biomedical instruments
7. Student will be able to understand the design and the background knowledge of biomedical instruments and specific applications of biomedical engineering.

UNIT-I **7hr**

Bioelectric Signals and Electrodes: Bio-potentials and their origin: ECG, EEG, EMG, ENG, ERG, EOG, MEG. Bio-potential electrodes, generalized medical instrumentation system-Man machine interface.

UNIT-II **6hr**

Diagnostic Equipments: ECG: normal and abnormal waveform, diagnosis interpretation, ECG leads connections, Einthoven triangle, Plethysmography, Blood pressure measurement: direct and indirect methods, Cardiac output measurements, Phonocardiography. Respiratory volume measurement, Impedance pneumograph, EEG: signal amplitudes and frequency bands, EEG machine, Blood-cell counter, Pulse oximeters.

UNIT-III **6hr**

Therapeutic Equipments: Heart lung machine, Dialyzers: basic principle of dialysis, different types of dialyzer, membranes, portable type. Cardiac pacemakers: external and Implantable pacemaker. Cardiac defibrillator: DC defibrillator, implantable defibrillator and defibrillator analyzer.

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UNIT-IV **6hr**

Imaging Instruments: Digital X-Rays: Principles and production of soft and hard x-rays, Scattered radiation, Image intensifier, Radiation detectors, X-ray Computerized Tomography (X-ray CT) - imaging modes and types.

Magnetic Resonance Imaging (MRI): Physics of nuclear magnetic resonance, T1and T2 relaxation time, spin-echo sequences.

Ultrasound and other Techniques: Propagation of ultrasound waves in fluids, solids and tissue. Doppler Effect, Ultrasonic transducers and instrumentation.

UNIT-V **5hr**

Patient Safety: Electric shock hazards, leakage currents, electrical safety analyzer, testing of biomedical equipments. Calibration and testing of biomedical equipments.

List of Experiment

1. Study of various types of electrodes.
2. Measure blood pressure using sphygmomanometer.
3. Measure respiration rate using respiration rate-meter
4. Measure body temperature using analog and digital thermometer.
5. Identify various leads selector network of ECG machine.
6. Obtain Lead –I, II, III, aVr , aVl , V1 … v6 type of ECG.
7. Demonstrate the Performance of EMG.
8. Demonstration of Phono-cardiograph machine.
9. EEG Alpha RMS Derivation – **(VIRTUAL Lab IIT Roorkee)**
10. EEG Entropy Calculation -**(VIRTUAL Lab IIT Roorkee)**

Text Books:

2. R.S.Khandpur, "Handbook of Biomedical Instrumentation", TMH Third Edition 2014.
3. Cromwell, "Biomedical Instrumentation and Measurements", Prentice Hall of India, New Delhi, 2007

Reference Books:

1. Joseph J. Carr and John M. Brown, "Introduction to Biomedical Equipment Technology", Pearson Education India, Delhi, 2004.
2. Webster, "Medical Instrumentation – Application & Design," John Wiley and sons Inc, Netherlands, 2009.
3. Arumugam.M. "Biomedical Instrumentation", Anuradha Agencies Publishers, Kumbakonam, 2006.

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SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTEI604		Transducers and signal Conditioning	60	20	20	30	20	2	1	2	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;
Q/A – Quiz/Assignment/Attendance, MST Mid Sem Test.

***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

4. To introduce the basic functional elements of instrumentation
8. To learn the fundamentals of electrical and electronic instruments
8. To educate on the comparison between various measurement techniques
- To understand various storage and display devices
- To introduce various transducers and signal conditioning methods.

Course Outcomes (COs):

After completion of this course the students will be able to

4. To apply knowledge of measurement system.
5. To identify, formulate, and solve the fundamentals of electrical and electronic instruments
6. Demonstrate various types of introduce various storage and display devices.
7. Demonstrate various types of transducers and their signal conditioning .

SYLLABUS

UNIT-I **6hr**

Introduction: Measurement systems, Basic electronic measuring system, Transduction principles, Classification of transducers, General transducers characteristics, Criteria for transducer selection: accuracy, precision, reproducibility.

UNIT-II **5hr**

Resistive Transducers: Principles of operation, construction, theory, advantages and disadvantages, Applications of Potentiometers, strain gauges, (metallic and semi-conductor type), Resistance Thermometer, Thermistors.

Inductive Transducers: Types of Inductive transducer, Principles of operation, construction, Advantages & disadvantages and applications, LVDT (Linear variable differential transformer).

UNIT-III **5hr**

Capacitive Transducers: Types of capacitive transducer, Principles of operation, construction, theory, advantages and disadvantages and applications of capacitive transducers based upon familiar equation of capacitance. Elastic Transducers: Spring bellows, diaphragm, bourdon tube – their special features and application.

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UNIT-IV **6hr**

Active Transducers: Principle of operation, construction, theory, advantages and disadvantages and applications of following transducers: Thermocouple, Piezo-electric transducer, Photo-voltaic transducer and Electrochemical transducer. Other Transducers: Optical transducers: photo-emissive, photo-conductive and Photo-voltaic cells.

UNIT-V **6hr**

Signal Conditioning: Concept of signal conditioning, Introduction to AC/DC Bridges(Maxwell's Inductance & capacitance) Op-amp circuits used in instrumentation : Instrumentation amplifiers, analogue-digital sampling, introduction to A/D(successive approximation type) and D/A (R to 2R and Ladder type)conversion, signal filtering, averaging, correlation, Interference, grounding , and shielding.

TEXT BOOK

1. Murty D V S, "Transducers & Instrumentation", PHI, New Delhi (2016)
2. Sawhney A K, "Electrical and Electronics Measurements and Instrumentation", Dhanpat Rai and Sons.(2015)

REFERENCE BOOKS

1. Kalsi H S, "Electronic Instrumentation "Tata McGraw Hill, New Delhi, 4th Ed. (2012).
2. Patranabis D, "Sensors and Transducers", PHI, New Delhi (2009).
3. Doebelin Ernest O,"Measurement Systems: Application and Design", Tata McGraw Hill Ltd., New Delhi(2004).

LIST OF EXPERIMENT

1. To perform and Study Cathode Ray Oscilloscope with its various features.
2. To perform experiment on strain gauge using load cell.
3. To perform measurement of displacement using LVDT.
4. To perform and study characterization of Thermocouples (J/T/K/R/S)
5. To perform and study Characterization of RTD.
6. To understand and study characteristics of thermistor.
7. Measurement of Pressure using Bellows, Bourdon gauge, Diaphragm.
8. Measurement of R,L & C parameter using AC bridges.
9. To perform and study analog to digital converters.
10. To perform and study digital to analog converters.

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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTEI611		Fiber Optics	60	20	20	30	20	3	1	2	5

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;

***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. To give the knowledge of Optical Instrumentation system to the students.
2. To develop the understanding of optical communication system.
3. To give the student a clear idea about the various strategies of optical fiber modes.
4. To give the knowledge of different techniques used in optical measurement systems

Course Outcomes (COs):

1. To make aware from terms and techniques used in optical instrumentation systems.
2. To make them aware from communication in different modes.
3. To give the knowledge of various optical networks and techniques.
4. Make them aware from various types of optical source like LED, LASER etc..

syllabus

Unit-1 **6hr**

Introduction to vector nature of light, Propagation of light, , ray model, wave model. Theory of image formation, Comma, acclamation, distortion, Chromative aberration

Unit-2 **5hr**

Different types of optical fibres, different type of optical fiber modes, step index and graded index fiber. Dispersion and attenuation in optical fiber.

Unit-3 **5hr**

Optical fiber in instrumentation, optical fibers as sensors, modulation techniques for sensors, fiber optic power measurement. Stabilized calibrated light sources.

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Unit-4 **5hr**

Optical power meters, optical attenuators, measurement techniques like optical time domain reflectometry, (OTDR), attenuation measurements

Unit-5 **6hr**

Optical Sources & detectors: LED and LASERS, photo detectors, pin detectors, detector responsitivity – noise, optical receivers.

List of Experiment

1. To perform Fiber Optic Analog Link and Digital Link
2. To Study and analyze Intensity Modulation Technique using Analog input signal
3. Perform Pulse Width Modulation in Fiber Optic Link.
4. Analysis & Measurement of propagation or attenuation loss in optical fiber.
5. Analysis & Measurement of bending loss in optical fiber.
6. To study & calculate Numerical Aperture (NA) of the fiber.
7. To Study of Diffraction gratings.
8. To develop & Study of Michelson Interferometer.
9. To Study & analyze of Reflection Holography.
10. To Study & Analyze of Transmission Holography.

TEXT BOOKS:-

1. John M. Senior, Optical Fibre Communications- Principles and Practice, 2nd Edition, Pearson Education, 2014.
2. Gerd Keiser,Optical Fiber Communication 4th edition, Tata McGraw-Hill Education,2014

REFERENCES:-

1. Ajoy Ghatak, Optics, 4th edition Tata McGraw-Hill Education,2012.
2. Allen H. Cherin, An Introduction to Fiber Optics, Tata McGraw-Hill Education,1987
3. David A. Krohn &Trevor W. MacDougall, Fiber Optic Sensors: Fundamentals and Applications, 4th Edition, SPIE PRESS BOOK, 2015
4. Max Ming-Kang Liu , Principles & Application of Optical Communication, 1st edition, TMH,1993

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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Term Two Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTEI612		**Digital Image Processing**	60	20	20	30	20	3	1	2	5

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES

1. To understand the fundamentals of digital image processing.
2. To create awareness about various types of Image transform used in digital image processing.
3. To give knowledge about the different types of Image enhancement techniques used in digital image processing.
4. Aware of the Image compression and Segmentation used in digital image processing.

COURSE OUTCOMES

Student will be able to:

1. Understand origin and use of digital image processing.
2. Explain the image fundamentals and mathematical transforms necessary for image processing.
3. Apply the image enhancement, compression, and restoration techniques.
4. Implement the image segmentation and representation techniques.

Unit I **8hr.**

Elements of Visual Perception, Image Sensing and Acquisition, Image Sampling and Quantization, Relationships between pixels.

Unit II **7hr.**

Image Transforms: 2-D FFT, Properties. Walsh transform, Hadamard Transform, Discrete cosine Transform, Haar transform, K-L Transform.

Gray level transformations, Histogram processing, Basics of Spatial Filtering, Smoothing and Sharpening Spatial Filtering.

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Unit III **6hr.**

Image Restoration: Model of Image Degradation/restoration process, Noise models, Inverse filtering, Least mean square filtering.

Unit IV **6hr.**

Image Segmentation: Edge detection, Edge linking via Hough transform, Thresholding, Region based segmentation, Region growing, Region splitting and Merging.

UNIT V **7hr.**

Need for data compression, Huffman coding, Run Length Encoding, JPEG standard, MPEG. Variable length coding, LZW coding, Bit plane coding, predictive coding.

Text Books:

1. Rafael C. Gonzalez, Richard E. Woods, "Digital Image Processing", 4th Edition, Pearson, 2018.
2. Wilhelm Burger, "Principles of Digital Image Processing: Advanced Methods", 2012.

References:

1. Rafael C. Gonzalez, Richard E. Woods & Steven L. Eddins, "Digital Image Processing using MATLAB", 2nd Edition, 2010.
2. Munesh Chandra Trivedi, "Digital Image Processing", 1st Edition, 2014.
3. Ikvinderpal Singh, "Digital Image Processing", 1st Edition, 2015.
4. Ashish Jain, "Digital Image Processing (Implementation Using MATLAB)", 2012.

List of Experiments:

1. Study of Matlab Image processing Toolbox.
2. Analysis of Pixel distance measurement Methods
3. Implementation of Image Input Output Techniques.
4. Perform Image representation Techniques.
5. Analysis of Image Display Techniques.
6. Perform Image reshaping Techniques.
7. Implementation Image filtering Techniques.
8. Analysis of Image Compression.
9. Analysis of Image Segmentation.
10. Analysis of Image Restoration.

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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTEI613		Linear Integrated Circuit	60	20	20	30	20	3	1	2	5

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):
The course is designed to aid students understand the fundamental concepts of linear integrated circuits and formulate and solve the design problems with an analog IC i.e. Operational amplifier.

Course Outcomes (COs):
After completing the course the students should be able to:

1. Develop a basic understanding of differential amplifier
2. Introduce to the basic Op-amp 741 and also study its specifications and characteristics.
3. Realize circuits, design for signal analysis using Op-amp ICs.
4. Describe the wide variety of Op-amp applications.

Syllabus

Unit – I **6hr**

Operational amplifier fundamentals: Introduction to Operational amplifier, block diagram schematic of an Operational Amplifier, basic op-amp symbol, op-amp parameters – CMRR and PSRR, offset voltages and currents, Input and output impedances, Input offset voltage, Offset current, Slew rate, op-amp as DC Amplifiers.

Unit-II **7hr**

Op-amp characteristics: Ideal op-amp characteristics, op-amp equivalent circuit, Inverting and Non-inverting configurations, op-amp analysis with and without feedback, effect of feedback on Op-amp voltage gain, input impedance; output impedance; bandwidth; offset voltage etc., gain bandwidth product, Introduction to Op-amp μa741

Unit-III **6hr**

General Op-amp applications: Summing amplifiers, Difference amplifier, Instrumentation amplifier, Multiplier and divider, differentiator and integrator, precision rectifiers, Limiting circuits.

Comparator/ phase detector, Crossing detectors, Schmitt trigger circuits, V to I and I to V converters -

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clamping circuits- peak detector.

Unit-IV **6hr**

Active Filters, Butterworth filter, First and second order Low pass & High pass filters, Band-pass filter, Band-reject filters, notch filter, All pass filters, Self tuned filter, Universal Active filter.

Unit-V **7hr**

Voltage Regulators: Introduction – Series op-amp regulator -IC Voltage regulators- General purpose regulator- Fixed and Variable voltage regulators- switching regulator IC.

Textbooks:

1. Floyd, Buchla,"Fundamentals of Analog Circuits, Pearson, 2013.
2. Sergio Franco, "Design with Operational Amplifiers and Analog Integrated Circuits", TMH, 3e, 2005
3. S Salivahanan, V S Kanchana Bhaaskaran,"Linear Integrated Circuits", McGraw Hill Education. Second edition
4. Bali, "Linear Integrated Circuits", TMH First Edition.

References:

1. Roy Choudhary, Shail Jain, 'Linear Integrated Circuits', II edition, New Age, 2003.
2. Ramakant A.Gayakward, 'Op-amps and Linear Integrated Circuits', IV Edition, Pearson Education, 2003 / PHI. 2000.

List of Experiments

1. Design & Realize inverting, Non Inverting and Buffer amplifier using 741 Op Amps.
2. Verify the operation of an Adder Circuit using Op AmpsIC 741.
3. Verify the operation of a Differentiator circuit using Op AmpsIC 741.
4. Verify the operation of an Integrator circuit using Op Amps741.
5. Design & Verify the operation of Subtractor circuit using Op Amps741.
6. Plot frequency response of AC coupled amplifier using Op Amps741
7. Study of IC 555 as Astable and MonostableMultivibrator.
8. To study ofAnalog to Digital converter.
9. To study of Digital to Analog converter.
10. To study the working of Wein Bridge Oscillator.(Content beyond syllabus)

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