DIPLOMA WING

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA , BHOPAL

SCHEME OF STUDIES & EXAMINATIONS (IMPLEMENTED FROM SESSION : JULY 2023)

SCHEME	NAME OF BRANCH AND BRANCH CODE	SEMESTER
OCBC JULY 2022/2023	ELECTRONICS AND TELECOMMUNICATION - E03 ELECTRONICS ENGINEERING - E06	FOURTH (IV)

S.N.	PAPER CODE	SUBJECT CODE	SUBJECT NAME	THEORY COMPONENT								PRACTICAL COMPONENT					TOTAL CREDITS	TOTAL MARKS
				HRS PER WEEK	CREDITS	TERM WORK				THEORY PAPER		HRS PER WEEK	CREDITS	LAB WORK	PRACTICAL EXAM/VIVA			
						QUIZ/ASSIGNMENT	MID TERM TEST*		TOTAL	MARKS	DURATION				MARKS	DURATION		
							I	II										
1	7461	401	MICROCONTROLLER AND APPLICATIONS	4	4	10	10	10	30	70	03 Hrs.	2	1	20	30	03 Hrs.	5	150
2	7462	402	ANALOG AND DIGITAL COMMUNICATION SYSTEMS	4	4	10	10	10	30	70	03 Hrs.	4	2	20	30	03 Hrs.	6	150
3	7463	403	CONSUMER ELECTRONICS	4	4	10	10	10	30	70	03 Hrs.	0	0	0	0	0	4	100
4	7464	404	ELECTRONIC EQUIPMENT MAINTENANCE	3	3	10	10	10	30	70	03 Hrs.	0	0	0	0	0	3	100
5	7465	405	LINEAR INTEGRATED CIRCUITS	3	3	10	10	10	30	70	03 Hrs.	4	2	20	30	03 Hrs.	5	150
6			MINOR PROJECT	0	0	0	0	0	0	0	0	4	2	20	30	03 Hrs.	2	50
7			ESSENCE OF INDIAN KNOWLEDGE AND TRADITION	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8			LIBERARY /SEMINAR/VISITS etc.	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
TOTAL				20	18				150	350		16	7	80	120		25	700

NOTE - (1)* Two Best,out of Three Mid Term Tests (Progressive Tests) Marks should be entered here.

GRAND TOTAL OF CREDITS	GRAND TOTAL OF MARKS
25	700

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DIPLOMA IN ELECTRONICS ENGINEERING (E06)

SEMESTER IV

COURSE TITLE	:	MICROCONTROLLER AND APPLICATIONS
PAPER CODE	:	7461
SUBJECT CODE	:	401
TREORY CREDITS	:	04
PRACTICAL CREDITS	:	01

Course Content:

Unit I: Introduction
Introduction to Microprocessors and Microcontrollers, Architectures [8085,8086] Intel MCS-51 family features – 8051 -organization and architecture

Unit II: Programming with 8051
10 8051 instruction set, addressing modes, conditional instructions, I/O Programming, Arithmetic logic instructions, single bit instructions, interrupt handling, programming counters, timers and Stack

Unit III
MCS51 and external Interfaces 8 User interface – keyboard, LCD, LED, Real world interface -
ADC, DAC, SENSORS Communication interface.

Unit IV:C programming with 8051
8 I/O Programming, Timers/counters, Serial Communication, Interrupt, User Interfaces- LCD, Keypad, LED and communication interfaces [RS232].

Unit V: ARM processor core based microcontrollers 14 Need for RISC Processor-ARM processor fundamentals, ARM core based controller [LPC214X], IO ports, ADC/DAC, Timers.

References:

S. No.	Title of Book	Author	Publication
1.	The 8051 Micro Controller and Embedded Systems	Muhammad Ali Mazidi & Janice Gilli Mazidi, R.D.Kinely	PHI Pearson Education, 5th Indian reprint
2.	Microprocessor and Microcontrollers	Krishna Kant	Eastern Company Edition, Prentice Hall of India, New Delhi
3.	Microprocessor & Microcontroller Architecture: Programming & Interfacing using 8085,8086,8051	Soumitra Kumar Mandal	McGraw Hill Edu,
4.	Microcontrollers: Architecture implementation and Programming	Tabak Daniel, Hintz Kenneth j	Tata McGraw Hill, 2007
5.	ARM Developer's Guide.UM10139 LPC214X User manual – Rev.4	Andrew N.Sloss, Dominic Symes, Chris Wright	User manual – Rev.4
6.	Microprocessors and interfacing: programming and hardware	Douglas V. Hall	Tata McGraw Hill, 2editon, 2007
7.	"Microcontroller – Fundamentals and Applications with Pic	Valder – Perez	Yeesdee Publishers, Tayler & Francis

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MICROCONTROLLER AND APPLICATIONS LAB

Course Content:

1. Programming 8051 Micro controller using ASM and C, and implementation in flash 8051 microcontroller.
2. Programming with Arithmetic logic instructions [Assembly]
3. Program using constructs (Sorting an array) [Assembly]
4. Programming using Ports [Assembly and C]
5. Delay generation using Timer [Assembly and C]
6. Programming Interrupts [Assembly and C]
7. Implementation of standard UART communication (using hyper terminal) [Assembly and C].
8. Interfacing LCD Display. [Assembly and C]
9. Interfacing with Keypad [Assembly and C]
10. Programming ADC/DAC [Assembly and C]
11. Interfacing with stepper motor. [Assembly and C]
12. Pulse Width Modulation. [Assembly and C] Programming ARM Micro controller using ASM and C using simulator. 11.Programming with Arithmetic logic instructions[Assembly]
13. GPIO programming in ARM microcontroller. [C Programming].
14. Timers programing in ARM Microcontroller. [C Programming].

References:

S.No.	Title of Book	Author	Publication
1.	The 8051 Micro Controller and Embedded Systems	Muhammad Ali Mazidi & Janice Gilli Mazidi, R.D.Kinely	PHI Pearson Education, 5th Indian reprint
2.	Microprocessor and Microcontrollers	Krishna Kant	Eastern Company Edition, Prentice Hall of India, New Delhi
3.	Microprocessor & Microcontroller Architecture: Programming & Interfacing using 8085,8086,8051	Soumitra Kumar Mandal	McGraw Hill Edu,
4.	Microcontrollers: Architecture implementation and Programming	Tabak Daniel, Hintz Kenneth j	Tata McGraw Hill, 2007
5.	ARM Developer's Guide. UM10139 LPC214X User manual – Rev.4	Andrew N.Sloss, Dominic Symes, Chris Wright	User manual – Rev.4
6.	Microprocessors and interfacing: programming and hardware	Douglas V. Hall	Tata McGraw Hill, 2editon, 2007
7.	"Microcontroller – Fundamentals and Applications with Pic	Valder – Perez	Yeesdee Publishers, Tayler & Francis

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SEMESTER IV

COURSE TITLE	:	ANALOG AND DIGITAL COMMUNICATION SYSTEMS
PAPER CODE	:	7462
SUBJECT CODE	:	402
TREORY CREDITS	:	04
PRACTICAL CREDITS	:	02

Course Content:

UNIT 1

Introduction to Communication Systems – Modulation – Types – Need for Modulation. Theory of Amplitude Modulation – Evolution and Description of SSB Techniques – Theory of Frequency and Phase Modulation – Comparison of Analog Communication Systems (AM – FM – PM).

UNIT 2
Block diagram and sub-system description of a digital communication system. Sampling of low-pass and band-pass signals, PAM , PCM, signal to quantization noise ratio analysis of linear and nonlinear quantizers, Line codes and bandwidth considerations; PCM TDM hierarchies, frame structures,
frame synchronization and bit stuffing.

UNIT 3
Quantization noise analysis of DM and ADM; DPCM and ADPCM; Low bit rate coding of speech and video signals. Baseband transmission, matched filter, performance in additive Gaussian noise; Intersymbol interference (ISI), Nyquist criterion for zero ISI, sinusoidal roll-off filtering, correlative coding, equalizers and adaptive equalizers; Digital subscriber lines.

UNIT 4
Geometric representation of signals, maximum likelihood decoding; Correlation receiver, equivalence with matched filter. Generation, detection and probability of error analysis of OOK, BPSK, coherent and non-coherent FSK, QPSK and DPSK; QAM, MSK and multicarrier modulation; Comparison of bandwidth and bit rate of digital modulation schemes.

UNIT 5
Introduction to Information and Coding Theories: Information Theory: information measures, Shan- non entropy, differential entropy, mutual information, capacity theorem for point-to-point channels with discrete and continuous alphabets. Coding Theory: linear block codes – definitions, properties, bounds on minimum distance (singleton, Hamming, GV, MRRW), soft versus hard decision decoding, some specific codes (Hamming, RS, Concatenated); Convolutional codes – structure, decoding (the Viterbi and BCJR algorithms); Turbo codes, LDPC codes.

References:

S. No.	Title of Book	Author	Publication
1.	Communication Systems	Haykin, S	4th Ed., John Wiley & Sons
2.	Modern Digital and Analog Communication Systems	Lathi, B.P. and Ding, Z	Intl. 4th Ed., Oxford University Press.
3.	Digital Communications	Proakis, J.G. and Saheli, M	5th Ed., McGraw-Hill
4.	Digital Communication: Fundamentals and Applica- tions	Sklar, B., and Ray, P.K	2nd Ed., Dorling Kindersley
5.	Elements of Information Theory	T. Cover and J. Thomas	2/e, Wiley.
6.	Principles of Digital Commu- nication	R. G. Gallager	Cambridge Univ. Press
7.	A Foundation in Digital Com- munication	A. Lapidoth	Cambridge Univ. Press
8.	Communication Systems	R. Anand	Khanna Book Publishing
9.	Error Control Coding	S. Lin and D. Costello	2/e, Prentice Hall.

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ANALOG AND DIGITAL COMMUNICATION SYSTMS LAB

Course Content:

1. Pulse Code Modulation and Differential Pulse Code Modulation.
2. Delta Modulation and Adaptive Delta modulation.
3. Simulation of Band Pass Signal Transmission and Reception • Amplitude Shift Keying • Frequency Shift Keying • Phase Shift Keying.
4. Performance Analysis of Band Pass Signal Transmission and Reception • Amplitude Shift Keying • Frequency Shift Keying • Phase Shift Keying.
5. Implementation of Amplitude Shift Keying
6. Implementation of Frequency Shift Keying
7. Implementation of Phase Shift Keying.
8. Time Division Multiplexing: PLL (CD 4046) based synch, clock and data extraction

References:

S. No.	Title of Book	Author	Publication
1.	Communication Systems	Haykin, S	4th Ed., John Wiley & Sons
2.	Modern Digital and Analog Communication Systems	Lathi, B.P. and Ding, Z	Intl. 4th Ed., Oxford University Press.
3.	Digital Communications	Proakis, J.G. and Saheli, M	5th Ed., McGraw-Hill
4.	Digital Communication: Fundamentals and Applications	Sklar, B., and Ray, P.K	2nd Ed., Dorling Kindersley
5.	Elements of Information Theory	T. Cover and J. Thomas	2/e, Wiley.
6.	Principles of Digital Communication	R. G. Gallager	Cambridge Univ. Press
7.	A Foundation in Digital Communication	A. Lapidoth	Cambridge Univ. Press
8.	Communication Systems	R. Anand	Khanna Book Publishing
9.	Error Control Coding	S. Lin and D. Costello	2/e, Prentice Hall.

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SEMESTER IV

COURSE TITLE	:	CONSUMER ELECTRONICS
PAPER CODE	:	7463
SUBJECT CODE	:	403
TREORY CREDITS	:	04
PRACTICAL CREDITS	:	00

Course Content:

UNIT-I Audio Fundamentals and Devices

Basic characteristics of sound signal, Audio level metering, decibel level in acoustic measurement,Microphone & Types, speaker types & working principle, Sound recording principle & types

UNIT-II Audio Systems

CD player, home theatre sound system, surround sound, Digital console block diagram, working prin-ciple, applications, FM tuner , ICs used in FM tuner TDA 7021T , PA address system.

UNIT-III Television Systems-

Monochrome TV standards, scanning process, aspect ratio, persistence of vision and flicker, interlace scanning, picture resolution, Composite video signal, Colour TV standards, colour theory, hue, bright- ness, saturation, luminance and chrominance, Different types of TV camera, Transmission standards

UNIT-IV Television Receivers and Video Systems-

PAL-D colour TV receiver, Digital TVs:- LCD, LED , PLASMA, HDTV, 3-D TV, projection TV, DTH receiv- er, Video interface, Digital Video, SDI, HDMI Multimedia Interface , Digital Video Interface, CD and DVD player

UNIT-V Home / Office Appliances

Diagrams, operating principles and controller for FAX and Photocopier, Microwave Oven, Washing Machine, Air conditioner and Refrigerators, Digital camera and cam coder.

References:

S. No.	Title of Book	Author	Publication
1.	Consumer Electronics	Bali S.P.	Pearson Education India,2010 , latest edition
2.	Audio video systems : principle practices & trou-bleshooting	Bali R and Bali S.P	Khanna Book Publishing Co. (P) Ltd., 2010Delhi , India, latest edition
3.	Modern Television prac-tices	Gulati R.R.	New Age International Publication (P) Ltd. New Delhi Year 2011, latest edition

4.	Audio video systems	Gupta R.G.	Tata Mc graw Hill, New Delhi, India 2010, latest edition
5.	Mastering Digital Television	Whitaker Jerry & Benson Blair	McGraw-Hill Professional, 2010, latest edition
6.	Standard handbook of Audio engineering	Whitaker Jerry & Benson Blair	McGraw-Hill Professional, 2010 , latest edition.

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SEMESTER IV

COURSE TITLE	:	ELECTRONIC EQUIPMENT MAINTENANCE
PAPER CODE	:	7464
SUBJECT CODE	:	404
TREORY CREDITS	:	03
PRACTICAL CREDITS	:	00

Course Content:

Unit 1 : Fundamental Troubleshooting Procedures Inside An Electronic Equipment: Reading Draw- ings And Diagrams – Block Diagram, Circuit Diagram, Wiring Diagram; Dis-assembly and re-assembly of equipment, Equipment Failures and causes such as poor design, production deficiencies, carelessstorage and transport, inappropriate operating conditions, Nature of faults, Fault location procedure, Fault finding aids – Service and maintenance manuals and instruction manuals, Test and Measuring instruments, special tools Troubleshooting techniques, Approaching components for tests, Ground-

ing systems in Electronic Equipment, Temperature sensitive Intermittent problems Corrective ac- tions, Situations where repairs should not be attempted.

Unit 2 : Passive Components and Their Testing Passive Components- Resistors, Capacitors, Induc- tors Failures in fixed resistors, testing of resistors, variable resistors, variable resistors as potenti- ometers, failures in potentiometers, testing of potentiometers, servicing potentiometers, LDRs and Thermistors Types of capacitors and their performance, Failures in capacitors, testing of capacitors and precautions therein, variable capacitor types, Testing of inductors and inductance measurement **Unit 3 :** Testing of Semiconductor Devices Types of semiconductor devices, Causes of failure in Semiconductor Devices, Types of failure Test procedures for Diodes, special types of Diodes, Bipolar Junction Transistors, Field Effect Transistors, Thyristors Operational Amplifiers, Fault diagnosis in op-amp circuits

Unit 4: Logic IC families, Packages in Digital ICs, IC identification, IC pin-outs, Handling ICs, Digital troubleshooting methods – typical faults, testing digital ICs with pulse generators Logic clip, Logic Probe, Logic Pulser, Logic Current Tracer, Logic Comparator Special consideration for fault diagnosis in digital circuits Handling precautions for ICs sensitive to static electricity Testing flip-flops, count- ers, registers, multiplexers and de-multiplexers, encoders and decoders; Tri-state logic.

Unit 5: Rework and Repair of Surface Mount Assemblies Surface Mount Technology and surface mount devices Surface Mount Semiconductor packages – SOIC, SOT, LCCC, LGA, BGA, COB, Flatpacks and Quad Packs, Cylindrical Diode Packages, Packaging of Passive Components as SMDs Repairing Surface Mount PCBs, Rework Stations.

References:

S. No.	Title of Book	Author	Publication
1.	Modern Electronic Equipment: Trouble-shooting, Repair and Maintenance	Khandpur	TMH 2006
2.	Electronic Instruments and Systems: Principles, Maintenance and Troubleshooting	R. G. Gupta	Tata McGraw Hill Edition 2001
3.	Student Reference Manual for Electronic Instrumentation Laboratories	David L Terrell	Butterworth-Heinemann
4.	Electronic Testing and Fault Diagnosis	G. C. Loveday, A. H	Wheeler Publishing

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SEMESTER IV

COURSE TITLE	:	LINEAR INTEGRATED CIRCUITS
PAPER CODE	:	7465
SUBJECT CODE	:	405
TREORY CREDITS	:	03
PRACTICAL CREDITS	:	02

Course Contents:

UNIT I - IC Fabrication and Circuit Configuration for Linear IC
Advantages of ICs over discrete components – Manufacturing process of monolithic Ics Construction of monolithic bipolar transistor – Monolithic diodes – Integrated Resistors Monolithic Capacitors – Inductors. Current mirror and current sources, Current sources as active loads, Voltage sources, Voltage References, BJT Differential amplifier with active loads, General operational amplifier stage and internal circuit diagrams of IC 741, DC and AC performance characteristics, slew rate, Open and closed loop configurations.

UNIT II- Applications of Operational Amplifiers
Sign Changer, Scale Changer, Phase Shift Circuits, Voltage Follower, V-to-I and I-to-V converters, adder, subtractor, Instrumentation amplifier, Integrator, Differentiator, Logarithmic amplifier, Antilogarithmic amplifier, Comparators, Schmitt trigger, Precision rectifier, peak detector, clipper and clamper, Low-pass, high-pass and band-pass Butterworth filters.

UNIT III -Analog Multiplier and PLL
Analog Multiplier using Emitter Coupled Transistor Pair - Gilbert Multiplier cell – Variable transconductance technique, analog multiplier ICs and their applications, Operation of the basic PLL, Closed loop analysis, Voltage controlled oscillator, Monolithic PLL IC 565, application of PLL for AM detection, FM detection, FSK modulation and demodulation and Frequency synthesizing.

UNIT IV-Analog to digital and digital to analog converters
Analog and Digital Data Conversions, D/A converter – specifications - weighted resistor type, R-2R Ladder type, Voltage Mode and Current-Mode R2R Ladder types switches for D/A converters, high speed sample-and-hold circuits, A/D Converters specifications - Flash type - Successive Approximation type - Single Slope type – Dual Slope type - A/D Converter using Voltage-to-Time Conversion Over-sampling A/D Converters.

UNIT V- Waveform generators and special function ICs
Sine-wave generators, Multivibrators and Triangular wave generator, Saw-tooth wave generator, ICL8038 function generator, Timer IC 555, IC Voltage regulators – Three terminal fixed and adjustable voltage regulators - IC 723 general purpose regulator Monolithic switching regulator, Switched capacitor filter IC MF10, Frequency to Voltage and Voltage to Frequency converters, Audio Power amplifier, Video Amplifier, Isolation Amplifier, Opto-couplers and fibre optic IC.

Textbooks/References:

S. No.	Title of Book	Author	Publication
1.	Design with operational amplifiers and analog integrated circuits, 3rd Edition	Sergio Franco	Tata McGraw-Hill, 2007
2.	Linear Integrated Circuits,	D.Roy Choudhry, Shail Jain	New Age International Pvt. Ltd
3.	System design using Integrated Circuits	. B.S.Sonde	New Age Pub, 2nd Edition, 2001
4.	Analysis and Design of Ana-log Integrated Circuits	Gray and Meyer	Wiley International, 2005.
5.	OP-AMP and Linear ICs	Ramakant A.Gayakwad	Prentice Hall / Pearson Education, 4th Edition, 2001
6.	Linear Integrated Circuits	R. Anand	Khanna Book Publishing,
7.	Operational Amplifier and Linear Integrated Circuits	K Lal Kishore	Pearson Education, 2006

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LINEAR INTEGRATED CIRCUITS LAB

List of Practicals/Experiments:

1. Operational Amplifiers (IC741)-Characteristics
2. Inverting and Non inverting Amplifiers
3. Summer, Difference Amplifier and Instrumentation Amplifier
4. Waveform shaping circuits using opamp
5. Comparator and Schmitt trigger
6. Waveform Generation using Op-Amp (IC741).
7. Applications of Timer IC555.
8. Design of Active filters.
9. Study and application of PLL IC's
10. Study of DAC and ADC 11. Op-Amp voltage Regulator- IC 723

Learning resources:

S. No.	Title of Book	Author	Publication
1.	Design with operational amplifiers and analog integrated circuits, 3rd Edition	Sergio Franco	Tata McGraw-Hill, 2007
2.	Linear Integrated Circuits,	. D.Roy Choudhry, Shail Jain	New Age International Pvt. Ltd
3.	System design using Integrated Circuits	. B.S.Sonde	New Age Pub, 2nd Edition, 2001
4.	Analysis and Design of Ana- log Integrated Circuits	Gray and Meyer	Wiley International, 2005.
5.	OP-AMP and Linear ICs	Ramakant A.Gayakwad	Prentice Hall / Pearson Education, 4th Edition, 2001
6.	Linear Integrated Circuits	R. Anand	Khanna Book Publishing,
7.	Operational Amplifier and Linear Integrated Circuits	K Lal Kishore	Pearson Education, 2006

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SEMESTER - IV

COURSE TITLE	:	MINOR PROJECT
PAPER CODE	:	--
SUBJECT CODE	:	--
TREORY CREDITS	:	00
PRACTICAL CREDITS	:	02

MINOR PROJECT –

Evaluation is based on work done, quality of report performance in viva-voce, presentation etc.

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DIPLOMA IN ELECTRONICS ENGINEERING (E06)

SEMESTER - IV

COURSE TITLE	:	ESSENCE OF INDIAN KNOWLEDGE AND TRADITION
PAPER CODE	:	--
COURSE CODE	:	--
TREORY CREDITS	:	00
PRACTICAL CREDITS	:	00

Course Content:

Basic Structure of Indian Knowledge System:

(i) वेद, (ii) उन्नवेद (आयवेद, धनुवेद गन्धवेद स्थाप्त्य आदद) (iii) वेदांग (शिक्षा कल्न ननरूत व्याकरण ज्योनतष छांद),

(iv) उन्नाइग (धर्म रीरांसा, नुराण, तकमिस्त्र)

- Modern Science and Indian Knowledge System
- Yoga and Holistic Health care
- Case Studies.

SUGGESTED TEXT/REFERENCE BOOKS:

S. No.	Title of Book	Author	Publication
1.	Cultural Heritage of In-dia-Course Material	V. Sivaramakrishna	Bharatiya Vidya Bhavan, Mumbai, 5th Edition, 2014
2.	Modern Physics and Vedant	Swami Jitatmanand	Bharatiya Vidya Bhavan
3.	The wave of Life	Fritzof Capra	
4.	Tao of Physics	Fritzof Capra	
5.	Tarkasangraha of Annam Bhatta, Inernational	V N Jha	Chinmay Foundation, Velliarnad, Amaku,am
6.	Science of Consciousness Psychotherapy and Yoga Practices	RN Jha	Vidyanidhi Prakasham, Delhi, 2016

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