

M.D. UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATION
B.Tech. IV YEAR (ELECTRONICS & INSTRUMENTATION ENGINEERING)

SEMESTER – VII

F' Scheme

EFFECTIVE FROM THE SESSION 2012-13

Course No.	Course Title	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
EI-401-F	PLCs & SCADA SYSTEMS	3	1	-	4	50	100	-	150	3
EI-403-F	Fuzzy Logic & Control	3	1	-	4	50	100	-	150	3
ECE-405-F	Wireless Communication (Common with ECE)	3	1	-	4	50	100	-	150	3
ECE-409-F	DIGITAL SIGNAL PROCESSING (Common with ECE)	3	1	-	4	50	100	-	150	3
	* Open Elective	3	1	-	4	50	100	-	150	3
	* Dept. Elective	3	1	-	4	50	100	-	150	3
ECE-423-F	WIRELESS & SATELLITE COMM. LAB			3	3	50		50	100	3
EI-431-F	PLCs & SCADA SYSTEMS LAB	-	-	2	2	50	-	50	100	3
ECE-429-F	Digital Signal Processing Lab	-	-	2	2	25	-	25	50	3
GPEI-401-F	GENERAL FITNESS FOR THE PROFESSION	-	-	-	-	-	-	50	50	3
EI-435-F	PRACTICAL TRAINING-II	-	-	2	2	-	-	-	-	-
	TOTAL	18	6	9	33	425	600	175	1200	

List of Open Electives

1.	HUM-451-F	Language Skills for Engineers
2.	HUM-453-F	Human Resource Management
3.	HUM-459-F	Renewable Energy Resources and Tecchnology
4.	ME-451-F	Mechatronics Systems
5.	IC-455-F	Intelligent Instrumentation for Engineers
6.	OR-401-F	Operations Research

Dept. Elective:

1	Wireless Sensor Networks	ECE-411-F	5	Advance Control Systems	EE-405-F
2	Mos ICs & Technology	EI-421-F	6	Radar & Sonar Engineering	EI-423-F
3	Optical Communication Systems	ECE-415-F			
4	Reliability of Electronic Systems	EI-437-F			

Note:

1. Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.
2. *Student will be permitted to opt for any one elective run by the other departments. However, the departments will offer only those electives for which they have expertise. The choice of the students for any elective shall not be a binding for the department to offer, if the department does not have expertise.
3. A team consisting of Principal/Director, HOD of concerned department and external examiner appointed by University shall carry out the evaluation of the student for his/her General Fitness for the Profession.
4. Assessment of Practical Training-II, carried out at the end of VI semester, will be based on seminar, viva-voce and project report of the student from the industry. According to performance, letter Grades A, B, C, F are to be awarded. A student who is awarded 'F' grade is required to repeat Practical Training.

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

SECTION-A

INTRODUCTION- PLCs, Adv. of PLCs Over Relay System, **I/O** Section – Fixed, **I/O**, Modular **I/O**, Discrete **I/O** Modules, Analog **I/O** Modules

PROCESSOR UNIT- Processor, Memory types, Guarding Against Electro Static Discharge, Peripherals, Memory Organizatio

SECTION-B

PROGRAMMING DEVICES- Programming Devices, Dedicated Desktop Programmes, Hand Held Programmers, Computer Programmers

LADDER DIAGRAM & PLC PROGRAMMING- Ladder Diagram Rules, Writing Diagram, Ladder Diagrams, Basic Stop / START Ckt, Digital Logic gates, Sequenced Motor Starting, Relay Type Instruction, Programming a PLC, PLC Peripherals, Network Limitation, Program Scanning

SECTION-C

Program Control Instruction- Marta Control Relay Instruction, Latching Relay instruction, Immediate **I/O** Instruction, Jump and Label Instruction

PROGRAMMING TIMER & COUNTERS- Pneumatic Timers, Cascading Timers, Alan Bradley PLCs Counters, Combining Timer & Counters

SECTION-D

SCADA- Introduction, Concept of Automatic SCADA, Architecture of SCADA, Hierarchical of SCADA, Microprocessor & PLC based SCADA systems and comparison, Data Acquisition Unit Remote Terminal Unit

TEXT BOOKS :

Technicians guide to Programmable Controller Richard A. Cox
Computer Process Control, by P.B. Despande, ISA Publications

REFERENCE BOOKS:

Programmable Controllers, by Petrezeulla , McGraw Hill, 1999
Programmable Logic Controllers, by T. Hughes, ISA Press, 1989

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

SECTION-A

INTRODUCTION ON FUZZY OPERATIONS: Background of fuzzy logic, Uncertainty and imprecision, statistics and random processes, Uncertainty of information, Fuzzy sets and membership, Classical sets, Operations on classical sets, Properties of classical sets, Mapping of classical sets to functions, Fuzzy sets, Fuzzy set operations, Properties of fuzzy sets, Cartesian product, Crisp relations, Cardinality of crisp relations, Operations on crisp relations, Properties of crisp relations, Composition, Fuzzy Relations, Cardinality of fuzzy relations, Operations on fuzzy relations, Properties of fuzzy relations, Fuzzy Cartesian Product and Composition, Tolerance and equivalence relations, Crisp equivalence relation, Crisp Tolerance relation, Fuzzy tolerance and equivalence relations. Related numericals.

SECTION-B

FUZZIFICATION AND DEFUZZIFICATION METHODS: Membership functions, Features of the membership function, Standard forms and boundaries, Fuzzification, Membership value assignments, Intuition, Inference, Rank ordering, Angular fuzzy sets, Genetic Algorithms, Computing Membership functions using genetic algorithms, Inductive reasoning, Fuzzy-To-Crisp conversions, lambda-cuts for fuzzy sets, Lambda-cuts for fuzzy relations, Defuzzification methods.

SECTION-C

FUZZY ARITHMETIC & LOGIC: Extension Principle, Crisp functions, mapping and relations, Functions of fuzzy sets-Extension principle, Fuzzy Transform(Mapping), Practical considerations, Fuzzy numbers, Fuzzy vectors, Classical logic and fuzzy logic, Classical predicate logic, Tautologies, Contradictions, Equivalence, Exclusive OR and Exclusive NOR, Logical proofs, Deductive Inferences, Fuzzy logic, Approximate reasoning, Fuzzy Tautologies, Contradictions, Equivalence, and Logical Proofs, Other forms of the Implication Operation and Composition operation.

SECTION-D

FUZZY RULE-BASE, NONLINEAR SIMULATION AND CONTROL SYSTEM: Natural Language, Linguistic Hedges, Rule-based Systems, Graphical Techniques of Inference, Fuzzy nonlinear simulation, Fuzzy relational equations, Partitioning, Non-linear simulation using fuzzy rule-based systems, Fuzzy Associative Memories(FAMs), Fuzzy control systems, Review of control system theory, Simple fuzzy logic controllers, General Fuzzy logic controllers, Special forms of fuzzy logic control system models, Examples of fuzzy control system Design, Classical fuzzy control problems.

TEXT BOOKS :

1. " Fuzzy logic with engineering applications": Timothy J. Ross: University of New Maxico. USA publisher: second edition.
2. " C++ Neural networks and fuzzy logic": Valluru B. Rao: M & T Books, IDG books worldwide, Inc, Edition 1.

REFERENCE BOOKS:

1. "An Introduction to Fuzzy Control" : D.,Driankov, H.Hellendoom & M.Reinfrank: Narosa.
2. "Fuzzy Control Systems" : Abraham Kandel & Gideon Imngholz ; Narosa New Delhi.

ECE-405-F
L T P
3 1 -

WIRELESS COMMUNICATION

Class Work : 50
Exam : 100
Total : 150
Duration of Exam : 3 Hrs.

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

INTRODUCTION TO WIRELESS COMMUNICATION SYSTEMS: Evolution of mobile radio communications, examples of wireless comm. systems, paging systems, Cordless telephone systems, comparison of various wireless systems.

MODERN WIRELESS COMMUNICATION SYSTEMS: Second generation cellular networks, third generation wireless networks, wireless in local loop, wireless local area networks, Blue tooth and Personal Area networks.

Section-B

INTRODUCTION TO CELLULAR MOBILE SYSTEMS: Spectrum Allocation, basic Cellular Systems, performance Criteria, Operation of cellular systems, analog cellular systems, digital Cellular Systems.

CELLULAR SYSTEM DESIGN FUNDAMENTALS: Frequency Reuse, channel assignment strategies, handoff Strategies, Interference and system capacity, tracking and grade off service, improving coverage and capacity.

Section-C

MULTIPLE ACCESS TECHNIQUES FOR WIRELESS COMMUNICATION: Introduction to Multiple Access, FDMA, TDMA, Spread Spectrum multiple Access, space division multiple access, packet ratio, capacity of a cellular systems.

Section-D

WIRELESS NETWORKING: Difference between wireless and fixed telephone networks, development of wireless networks, fixed network transmission hierarchy, traffic routing in wireless networks, wireless data services, common channel signaling, ISDN (Integrated Services digital Networks), advanced intelligent networks.

INTELLIGENT CELL CONCEPT AND APPLICATION: Intelligent cell concept, applications of intelligent micro-cell Systems, in-Building Communication, CDMA cellular Radio Networks.

TEXT BOOKS:

1. Wireless Communications: Theodore S. Rappaport; Pearsons.
2. Mobile Cellular Telecommunication: W.C.Y.Lee; McGraw Hill

REFERENCE BOOK:

Mobile Communications: Jochen Schiller; Pearson

EI-421-F

MOS ICs & TECHNOLOGY

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

SECTION-A

REVIEW OF MOS TECHNOLOGY: Introduction to IC technology, MOS transistor enhancement mode and depletion mode operations, fabrication of NMOS, CMOS and Bi CMOS devices. Equivalent circuit for MOSFET and CMOS.

MOS TRANSISTOR THEORY : MOS device design equation, MOS transistor, evaluation aspect of MOS transistor, threshold voltage, MOS transistor transconductance and output conductance, figure of merit, determination of pull up to pull down ratio for an NMOS inverter driven by another NMOS inverter and by one or more pass transistor, alternative forms of pull up, CMOS and Bi CMOS inverters, latch up in CMOS circuitry and Bi CMOS latch up susceptibility.

SECTION-B

MOS CIRCUITS AND LOGIC DESIGN : Basic physical design of simple logic gates using NMOS, PMOS and CMOS, CMOS logic gate design considerations, CMOS logic structure, CMOS logic structure, clocking strategies.

SECTION-C

CIRCUIT CHARACTERIZATION AND PERFORMANCE ESTIMATION: Resistance estimation, capacitance estimation, inductance, switching characteristics, CMOS gate transistor sizing, power dissipation.

VLSI FABRICATION : Crystal growth, wafer preparation, epitaxy, oxidation, lithography, etching, diffusion, dielectric and poly silicon film deposition, ion implantation, yield and reliability, metallization.

SECTION-D

DESIGN EXAMPLE USING CMOS : Incrementer/decrementer, left/right shift serial/ parallel register, comparator for two n bit number, a two phase non overlapping clock generator with buffer output on both phases, design of an event driven element for EDL system.

TEXT BOOKS :

1. Introduction to digital integrated circuit by Rabaey, Chandrakasan and Nikolic
2. Principles of CMOS VLSI Design by Neil H.E. Weste and Kamran Eshraghian , Pearson publication.

REFERENCE BOOKS:

1. Introduction to digital circuit by Rabaey andLPE (PH)
2.by S K Gandhi
3. VLSI Technology : S M Sze , Mc Graw-Hill
4. Integrating circuits by K R Botkar, Khanna Publisher

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

SECTION-A

INTRODUCTION TO RADAR: Radar Block Diagram & operation, Radar Frequencies, Radar development, Application of Radar. Radar Equation, Simple form of Radar Equation, Prediction of Range performance, Minimum detectable signal, Receiver noise, Signal to Noise ratio, Transmitter Power, Pulse repetition frequency & range ambiguities, System losses, Propagation effects.

SECTION-B

CW & FREQUENCY MODULATED RADAR: The Doppler effect, CW Radar, Frequency-modulated CW Radar, Multiple Frequency CW Radar.

TRACKING RADAR: Tracking with Radar, Sequential Lobbing, Conical Scan, Monopulse Tracking Radar, Tracking in range, Acquisition.

SECTION-C

MTI & PULSE DOPPLER RADAR:

Introduction, Delay Line Cancellors, Multiple or staggered, Pulse repetition frequencies, range-Gated Doppler Filters, Digital Signal Processing, Other MTI delay line, Limitation of MTI performance, Noncoherent MTI, Pulse Doppler Radar, MTI from a moving platform.

SECTION-D

RECEIVERS, DISPLAYS & DUPLEXERS:

Radar Receivers, Noise Figure, Mixer, Low-noise Front ends, Displays, Duplexer, Receiver protectors.

INTRODUCTION TO SONAR:

Introduction, history, underwater propagation, acoustic waves, propagation speed, sound velocity profiles, sound pressure level, propagation modes, multipath, active SONAR, passive SONAR.

TEXT BOOKS :

Introduction to Radar Systems: Merrill I. Skolnik, ; McGraw Hill Publications

REFERENCE BOOKS:

Electronic Communication Systems : Kennedy; Tata McGraw Hill Publications

EE-405-F

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3 1 -

ADVANCED CONTROL SYSTEMS

Theory : 100

Class Work : 50

Total : 150

Duration of Exam : 3 Hrs.

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

STATE VARIABLE TECHNIQUES: State variable representation of systems by various methods. Solution of state equations-state transition matrix. Transfer function from state variable model. Controllability & observability of state variable model.

Section-B

SECOND ORDER SYSTEMS & STATE PLANE: Phase portrait of linear second systems. Method of isoclines, phase portrait of second order system with non-linearities, limit cycle, singular points.

Section-C

DESCRIBING FUNCTION ANALYSIS: Definition, limitations, use of describing function for stability analysis, describing function of ideal relay, relay with hysteresis & dead zone, saturation/coulomb friction & backlash,

LINEAR APPROXIMATION OF NONLINEAR SYSTEMS: Taylor series, Liapunov's 2nd method.

Section-D

SAMPLED DATA SYSTEMS: Sampling process, impulse modulation, mathematical analysis of sampling process, application of Laplace transform, Shannon's theorem, reconstruction of sampled signal zero order & first order hold, Z-transform, definition, evaluation of Z-transform, Inverse Z-transform, pulse transfer function, limitations of Z-transform, state variable formulation of discrete time systems. Solution of discrete time state equations, stability, definition, the Schur-Cohn stability criterion, Jury's test of stability of extension of Routh-Hurwitz criterion to discrete time systems.

TEXT BOOKS:

1. Digital Control & State Variable Methods : M.Gopal ; TMH.
2. Modern Control Systems, 11/e: Richard C. Dorf; Pearson

REFERENCE BOOKS :

1. Modern Control Theory : M.Gopal ; Wiley International.
2. Discrete Slotine & W.P.Li; Prentice Hall, USA,
3. Digital Control Systems : B.C.Kuo
4. Applied non-linear control : J.E.
5. Nonlinear Control Systems: Isidari ; Springer-Verlag.

L T P
3 1 0

CLASS WORK : 50
EXAM. : 100
TOTAL : 150
DURATION OF EXAM : 3 HRS

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

SECTION-A

Introduction To Optical Communication Systems :

Electromagnetic spectrum used for optical communication, block diagram of optical communication system. Basics of transmission of light rays. Advantages of optical fiber communication.

Optical Fibers:

Optical fibers structures and their types, fiber characteristics : attenuation, scattering, absorption, fiber bend loss, dispersion; fiber couplers and connectors

SECTION-B

Led Light Source :

Light emitting diode : recombination processes, the spectrum of recombination radiation, LED characteristics, internal quantum efficiency, external quantum efficiency, LED structure, lens coupling to fiber, behavior at high frequencies.

SECTION-C

Laser Light Source :

Basic principles of laser action in semi -conductors, optical gain, lasing threshold, laser structures and characteristics, laser to fiber coupling, comparison with LED source.

SECTION-D

Avalanche And Pin Photodetectors:

Principles of optical detection, quantum efficiency, responsivity, general principles of PIN photodetector, intrinsic absorption, materials and designs for PIN photodiodes, impulse and frequency response of PIN photodiodes, noise in PIN Photodiodes, multiplication process, APD Design, APD bandwidth, APD noise.

TEXT BOOKS

Optical Fiber Communications: John M Senior; PHI.

REFERENCE BOOKS

1. Optical Communication Systems : John Gowar; PHI.
2. Optical Fiber Communications : Gerd Keiser; TMH
3. Optical fiber Communication : Selvarajan, Kar, Srinivas; TMH.

ECE-411-F

L T P

3 1 -

WIRELESS SENSOR NETWORKS

Class Work : 50

Exam : 100

Total : 150

Duration of Exam : 3 Hrs.

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A**OVERVIEW OF WIRELESS SENSOR NETWORKS :**

Challenges for Wireless Sensor Networks, Enabling Technologies For Wireless Sensor Networks.

Section-B**ARCHITECTURES:**

Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes , Operating Systems and Execution Environments, Network Architecture - Sensor Network Scenarios, Optimization Goals and Figures of Merit, Gateway Concepts.

Section-C**NETWORKING SENSORS :**

Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts - S-MAC , The Mediation Device Protocol, Wakeup Radio Concepts, Address and Name Management, Assignment of MAC Addresses, Routing Protocols- Energy-Efficient Routing, Geographic Routing.

Section-D**INFRASTRUCTURE ESTABLISHMENT :**

Topology Control , Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control.

TEXT BOOKS:

1. Holger Karl & Andreas Willig, " Protocols And Architectures for Wireless Sensor Networks" , John Wiley, 2005.
2. Feng Zhao & Leonidas J. Guibas, "Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007.

REFERENCES:

1. Kazem Sohraby, Daniel Minoli, & Taieb Znati, "Wireless Sensor Networks- Technology, Protocols, And Applications", John Wiley, 2007.
2. Anna Hac, "Wireless Sensor Network Designs", John Wiley, 2003.

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section A

Concept of Reliability: Failures of systems and its modes, Measure of Reliability, Reliability function, Hazard rate MTBF and their inter-relations.

Reliability Data and Analysis: Data Sources, Data collection, use of Reliability Data, Reliability Analysis, Performance Parameters, Calculation of failure rate, Application of Weibull distribution.

Section B

System Reliability and Modeling: Series systems, Parallel system, series –parallel systems. Time dependence, Reliability Determination, Stand by Systems, r out of n, configurations, Methods of tie set and cut sets of Or reliability evaluation, simulation and Reliability prediction. Monte Carlo method, concepts of network topology. Overall reliability evolution.

Section C

Maintainability and Availability: Maintainability and its equation. Factors affecting maintainability, Measures of Maintainability, Mean down Time, Available Intrinsic availability equipment availability & Mission availability. Replacement processes and Policies.

Section D

Life Testing of Equipments: Non-destructive tests, destruction tests and their Mathematic modeling. Quality and Reliability, Measurement & prediction of Human Reliability, Reliability and safety, safety margins in critical Devices, case studies.

Value Engineering: Techniques in value Engg. Reliability Management.

Reference Books:

- 1) Reliability Engineering: A.K.Govil
- 2) Reliability Engineering: Dr AK Aggarwal
- 3) Reliability Engineering: E Balagurusami; TMH
- 4) Reliability Engineering: L S Shrinath; EWP
- 5) Related IEEE Research Papers

L T P

Class Work : 50

3- 1 -0

Exam : 100

Total : 150

Duration of Exam : 3 Hrs.

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

INTRODUCTION TO OPTICAL COMMUNICATION SYSTEMS : Electromagnetic spectrum used for optical communication, block diagram of optical communication system. Basics of transmission of light rays. Advantages of optical fiber communication.

Section-B

OPTICAL FIBERS: Optical fibers structures and their types, fiber characteristics : attenuation, scattering, absorption, fiber bend loss, dispersion; fiber couplers and connectors.

Section-C

LED LIGHT SOURCE : Light emitting diode : recombination processes, the spectrum of recombination radiation, LED characteristics, internal quantum efficiency, external quantum efficiency, LED structure, lens coupling to fiber, behavior at high frequencies.

LASER LIGHT SOURCE : Basic principles of laser action in semi -conductors, optical gain, lasing threshold, laser structures and characteristics, laser to fiber coupling, comparison with LED source.

Section-D

AVALANCHE AND PIN PHOTODETECTORS: Principles of optical detection, quantum efficiency, responsivity, general principles of PIN photodetector, intrinsic absorption, materials and designs for PIN photodiodes, impulse and frequency response of PIN photodiodes, noise in PIN Photodiodes, multiplication process, APD Design, APD bandwidth, APD noise.

TEXT BOOK:

Optical Fiber Communications: John M Senior; Pearson.

REFERENCE BOOKS :

1. Optical Communication Systems : John Goward; PHI.
2. Optical Fiber Communications : Gerd Keiser; TMH
3. Optical Communication System, (2nd Edition): Satinder Bal Gupta and Ashish Goel; University Science Press
4. Optical fiber Communication : Selvarajan, Kar, Srinivas; TMH.
5. Optical Fiber Communication System by MK Raina, Satya Parkashan, New Delhi.

ECE-409-F

DIGITAL SIGNAL PROCESSING

L T P

3 1 -

Class Work : 50

Exam : 100

Total : 150

Duration of Exam : 3 Hrs.

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

DISCRETE-TIME SIGNALS: Signal classifications, frequency domain representation, time domain representation, representation of sequences by Fourier transform, properties of Fourier transform, discrete time random signals, energy and power theorems.

DISCRETE-TIME SYSTEMS : Classification, properties, time invariant system, finite impulse Response (FIR) system, infinite impulse response (IIR) system.

Section-B

SAMPLING OF TIME SIGNALS: Sampling theorem, application, frequency domain representation of sampling, reconstruction of band limited signal from its samples. discrete time processing of continuous time signals, changing the sampling rate using discrete time processing.

Z-TRANSFORM : Introduction, properties of the region of convergence, properties of the Z-transform, inversion of the Z-transform, applications of Z-transform.

Section-C

BASICS OF DIGITAL FILTERS : Fundamentals of digital filtering, various types of digital filters, design techniques of digital filters : window technique for FIR, bi-linear transformation and backward difference methods for IIR filter design, analysis of finite word length effects in DSP, DSP algorithm implementation consideration. Applications of DSP.

Section-D

MULTIRATE DIGITAL SIGNAL PROCESSING: Introduction to multirate digital signal processing, sampling rate conversion, filter structures, multistage decimator and interpolators, digital filter banks.

TEXT BOOKS :

1. Digital Signal Processing : Proakis and Manolakis; Pearson
2. Digital Signal Processing: Salivahanan, Vallavaraj and Gnanapriya;TMH

REFERENCE BOOKS:

1. Digital Signal Processing: Alon V. Oppenheim;PHI
2. Digital Signal processing(II-Edition): Mitra, TMH

L T P

0 0 2

CLASS	WORK	:	50
EXAM		:	50
TOTAL		:	100
DURATION OF EXAM		:	3 HRS

LIST OF EXPERIMENTS:

1. Familiarization with architecture & operation of 8 & 16 bit microcontroller
2. Study of functioning of different components of PLC in hardware.
3. Two inputs are given to a PLC & a output is taken. Verify the scan time of PLC with heoretical value.
4. To Interface the PLC with computer by using RS -232.
5. To study the PLC software.
6. Write a ladder program in PLC software by using 5 digital inputs & one digital output & verify it by applying it on hardware.
7. Write a ladder program by using -4 digital input & one times in series for a delay of 10 min. in o/p.
8. Write a ladder program by using counter Component.
9. Make a project by using PLC software and implement it on hardware.
10. Write a program in statement logic and control logical flowchart & verify it using ladder diagram.
11. Design of data acquisition system using PCI/NI card.
12. Online control of PC based liquid level control/indicator system.
13. Study of SCADA systems and applications.

NOTE: Atleast ten experiments are to be performed , atleast seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

LIST OF EXPERIMENTS:

Perform the experiments using DSP Hardware Processor using Programmes in C Language:

1. To understand sampling theorem & generation of waveforms like sine, square & Triangle.
2. To study Quantization technique .
3. To study PCM encoding & Hamming code generation.
4. To Study Digital modulation techniques ASK/FSK& PSK .
5. To study FIR Filter Implementation.
6. To study Auto correlation & Linear convolution.

Experiments To be performed on MATLAB

1. represent basic signals (Unit step, unit impulse, ramp, exponential, sine and cosine).
2. To develop program for discrete convolution.
3. To develop program for discrete correlation.
4. To design analog filter(low-pass, high pass, band-pass, band-stop).
5. To design digital IIR filters(low-pass, high pass, band-pass, band-stop).
6. To design FIR filters using windows technique.

NOTE:

At least ten experiments have to be performed in the semester.

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-- 3

Class Work : 50

Exam : 50

Total : 100

Duration of Exam : 3 Hrs.

LIST OF EXPERIMENTS:

1. To set up a satellite communication link & study of change in uplink & downlink frequency.
2. To Study Transmission of Audio & Video Signals & Data communication over satellite link .
3. To Study Transmission of telemetry data like temperature & light intensity over satellite link
4. To measure the propagation delay of signal in a Satellite communication Link.
5. To study different GPS data like longitude, latitude & different types of dilute of precision using GPS receiver..
6. To study selection of various PN codes like Gold, Barker & MLS in CDMA technology .
7. To study generation (spreading) & demodulation (Despreading) of of DSSS modulated signal
8. To study Voice communication over DSSS.
9. To study Minimum shift keying modulation & de modulation .
10. To study radiation pattern & calculate beam width for Yagi uda & Folded dipole antenna.
11. To study radiation pattern & calculate beam width for Circular & Triangular Patch Antenna.
- 12.To study FHSS Modulation & demodulation & transfer of numeric data.

NOTE:

At least ten experiments are to be performed.

GPEI-401-F

L T P

GENERAL FITNESS FOR THE PROFESSION

Class Work : -- Marks

Practical : 50 Marks

Total Marks : 50 Marks

At the end of each year students will be evaluated on the basis of their performance in various fields. The evaluation will be made by the panel of experts/examiners/teachers to be appointed by the rincipal/Director of the College. A specimen perform indicating the weight age to each component/ activity is given below :-

Name : _____ College Roll No. _____

Univ.Roll No. _____

Branch _____ Year of Admission _____

I. Academic Performance (15 Marks) :

(a) Performance in University Examination :-

Sem.	Result	%age of Marks obtained	Number of Attempt in which the Sem. exam. has been cleared
------	--------	------------------------	--

I
II
III
IV
V
VI
VII

II. Extra Curricular Activities (10 Marks) :

Item	Level of Participation	Remarks (Position Obtained)
------	------------------------	-----------------------------

Indoor Games (Specify the Games)	_____	_____
	_____	_____
	_____	_____

Outdoor Games (Specify the Games)	_____	_____
	_____	_____
	_____	_____

Essay Competition	_____	_____
	_____	_____
	_____	_____

Scientific Technical Exhibitions	_____	_____
	_____	_____
	_____	_____

Debate	_____	_____
	_____	_____
	_____	_____

Drama	_____	_____
	_____	_____
	_____	_____

Dance	_____	_____
	_____	_____
	_____	_____

Music	_____	_____
	_____	_____
	_____	_____

Fine Arts _____

Painting _____

Hobby Club _____

N.S.S. _____

H ostel Mgt
 Activities _____

Any other
 activity (Please
 Specify) _____

III. Educational tours/visits/Membership of Professional Societies (5 Marks)

1. _____
 2. _____
 3. _____
 4. _____
 5. _____
 6. _____

IV. Contribution in NSS Social Welfare Floor Relief/draught relief/Adult Literacy mission/Literacy Mission/Blood Donation/Any other Social Service (5 Marks)

1. _____
 2. _____
 3. _____
 4. _____
 5. _____
 6. _____

V. Briefly evaluate your academic & other performance & achievements in the Institution (5 Marks)

VI. Performance in Viva voce before the committee (10 Marks)

*Marks obtained 1.()+II()+III()+IV()+V()+VI()=
 **Total Marks :

Member

Member

Member

Member

Member

(OPEN ELECTIVES)

HUM-451-F

L T P

3 1 0

LANGUAGE SKILLS FOR ENGINEERS

Class Work Marks: 50

Exam Marks: 100

Total Marks: 150

Duration of Exam: 3 Hrs.

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to Attempt 5 questions out of 9 questions.

The real challenge before the students starts when they cross the threshold of the college after completing their degree. They, all of a sudden, find themselves competing for job/P.G. Degrees, through various entrance tests and interviews. Verbal ability forms a major portion of these tests. Without sound language skills and its semantic-syntactic know-how, the students with engineering background find themselves almost under- prepared for such tests. With this difficulty of students in mind, this course is proposed to make them technically proficient in handling the language skills required in competitive exams. The course would expose students to almost all variety of items, the common run of such tests as CAT, GMAT etc. And in the context of LPG, this cutting edge competence becomes imperative, and no professional education can afford to overlook this aspect.

Section A

Remedial English : Parts of speech, Gerunds, Participles and infinitives; Clauses; Sentence-constructions (unity; avoidance of choppy and rambling sentences, logic and consistency, conciseness, sequencing of ideas); Sentence errors-agreement between verb and subject, pronoun and antecedents, sequence of tenses, problems involving modifiers (dangling and misplaced modifiers); Shifts in point of view consistency of number and person, tense, mood, voice and subject; Parallelism; Omissions and mixed constructions.

Section B

Vocabulary : Methods of building vocabulary-etymological roots, prefixes and suffixes; Commonly used foreign words and phrases; spelling; words often confused synonyms and homonyms; one word substitutes; verbal idioms.

Section C

Punctuation and Mechanics: End Punctuation; internal Punctuation; Word Punctuation. Comprehension: Abstracting; Summarizing; Observation, Findings and Conclusions; Illustration and Inductive Logic; Deduction and Analogy.

Section D

Presentation: Oral presentation- Extempore, discussion on topics of contemporary relevance, Interviews.

TEXT BOOKS:

1. Working with words by R. Gairns and S. Redman, Cambridge University Press, London.
2. Meanings into Words-Upper Intermediate Students Book, Deff/Jones, Foundation Books (Cambridge University Press), Delhi.
3. A Practical English Grammar by A.J. Thomson and A.V. Martinet, OUP, Delhi.
4. Examine your English by Margaret M. Maison, Orient Longman, New Delhi.
5. A Practical Guide to Colloquial Idiom by W.J. Ball. Longman.
6. A guide to correct English by L.A. Hill, Oxford.
7. Structural Essentials of English by H. Whitehall, Longman.
8. Advanced English Practice by B.D. Graver, OUP, Delhi
9. Public Speaking, Sudha Publication Pvt. Ltd., New Delhi.
10. Group Discussion, Sudha Publication Pvt. Ltd., New Delhi.

HUM-453-F

L T P

3 1 0

HUMAN RESOURCE MANAGEMENT

Class Work Marks: 50

Exam Marks: 100

Total Marks:

150

Duration of Exam: 3

Hrs.

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section A

Understanding Organizational Behavior: Definition, Goals of Organizational behavior. Key forces affecting Organizational Behavior. Fundamental Concepts of Organizational Behavior. Motivation : Meaning, Objectives and importance of motivation. Theories of Motivation, Maslow's theory, Mc Greger's Theory Herzberg's theory. Morale : Meaning; Factors affecting morale, types of morale and productivity, Evaluation of morale, improving morale.

Section B

Communication: Definition & importance, Nature of leadership various approaches to leadership styles.

Leadership: Definition & importance, Nature of leadership various approaches to leadership styles.

Section C

Importance of human resources in industry, Definition of human resource management, mechanical approach towards personnel, Paternalism, Social system approach. Need for human resource planning, process of human resource planning, Methods of recruitment, Psychological tests and interviewing meaning and importance of placement Meaning and techniques of induction. Training and development : Concepts of training and development, importance of training and development, Management development its nature, purpose and method.

Section D

Significant factors affecting compensation, Methods of wage payment, Wage differentials, Causes of difference in Wages, Types of wage differentials, Wage incentives, Meaning, Objectives, types of incentive plans.

Text Books:

1. Human Resource and Personnel Management-K. Aswathappa-Tata McGraw Hill Publishing Company Ltd.

2. Personnel Management : C.B. Mamoria, Himalaya Publishing House.

3. Organisational Behavior-Dr. L.M. Prasad (Sultan Chand & Sons).

Reference Books:

1. Personnel Management & Industrial Relations : Dr. T.N.Bhagoliwal Sahitya Bhawan Agra.

2. Personnel Management : V.G. Karnik, Jaico Publishing House.

3. Personnel management & Industrial Relation : Tripathi : Sultan Chand & Sons.

4. Personnel Management-Arun Monappa & Mirza Saiyadain- Tata McGraw Hill Publishing Co. Ltd.

5. Personnel Management and Industrial Relations-D.C. Sharma & R.C. Sharma S.J. Publications.

6. Principles of Personnel Management-Edwin B. Flippo (McGraw Hill).

7. Organizational Behavior-K. Adwathappa.

8. Organizational Behavior-John W. Newsstom & Keith Davis, Tata McGraw Hill Publishing Company Limited, New Delhi.

HUM-459-F

RENEWABLE ENERGY RESOURCES & TECHNOLOGY

L T P

3 1 -

Theory : 100

Class Work : 50

Total : 150

Duration of Exam : 3 Hrs.

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections

which will be compulsory and of short answer type. Two questions will be set from each of the four

sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section -A

Introduction: Energy Sources and their availability, renewable energy sources, Prospects of renewable energy sources, application of non conventional and renewal energy sources.

Environmental Aspects of Electric Energy Generation: Introduction Thermal pollution, Atmospheric pollution, Effects of Hydroelectric projects, Nuclear power generation and environment, Green House Gas Effects, Global Environmental awareness, Energy options for Indian Economy.

Section -B

Solar Energy : Solar radiation estimation, Basic Principle of Solar Energy physical Principal of the conversion of solar radiation into heat, Collectors, Solar Energy storage system, solar thermal electric conversion, solar electric Power Plant & applications.

Wind Energy: Basic Principle of wind energy conversion, nature & Power of wind, site selection, wind energy conversion SYSTEM. Scheme for Electric Generation, Generator Control load control, Inter connected SYSTEM & applications.

Section -C

Bio Mass Energy: Biomass conversion technologies bio mass generation, classification of Bio Gas Plants material used in Bio Gas Plants., Selection of site & applications.

Geothermal Energy: Sources of Geothermal energy Estimation of Geothermal Power, Geothermal Power Plants, Geothermal energy in India and Prospects.

Ocean Energy: Ocean thermal electric conversion, site selection, Power Plant, Prospects of ocean energy in India, tidal Power tidal Power Plant, Prospects in India.

Section -D

MHD & Hydrogen Energy: Basic Principle MHD SYSTEM, advantages, Power OUTPUT of MHD Generation, future Prospects. Principle and classification of fuel cell energy, hydrogen as alternative fuel for Generation of Electrical Energy & applications.

Fuel Cell: Fuel Cell, Management of Fuel, Thermionic power generation, water Resource Electricity deviend scenario storage and handling, Pricing, Contract etc, Introduction to risk,

rules and regulation Aspects of Risk & Hazard Health & risk assessment visit to site, Mini hydro generators.

TEXT BOOKS:

1. Renewable Energy Sources and Emerging Technologies : D.P Kothari, K.C.Singla, Rakesh Ranjan - PHI Publications.
2. NON-Conventional energy Sources : G.D. Rai – Khanna Publications.
3. Renewal energy sources and their environmental aspects by Abbari: PHI
4. Electric Power : Dr. S.L. Uppal - Khanna Publications

REFERENCE BOOKS:

1. Power Plant Engineering : Jain & Bala Subramanyam

ME-451-F

MECHATRONICS SYSTEMS

L T P

3 1 -

Marks

Theory : 100 Marks

Class work : 50

Total : 150 Marks

Duration of Exam : 3 Hours

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section A

INTRODUCTION : Definition – Trends - Control Methods: Standalone , PC Based (Real Time Operating Systems, Graphical User Interface , Simulation) - Applications: SPM, Robot, CNC, FMS, CIM.

SIGNAL CONDITIONING : Introduction – Hardware - Digital I/O , Analog input – ADC , resolution , speed channels

Filtering Noise using passive components – Resistors, capacitors - Amplifying signals using OP amps –

Software - Digital Signal Processing – Low pass , high pass , notch filtering

Section B

PRECISION MECHANICAL SYSTEMS : Pneumatic Actuation Systems - Electro-pneumatic Actuation

Systems - Hydraulic Actuation Systems - Electro-hydraulic Actuation Systems - Timing Belts - Ball

Screw and Nut - Linear Motion Guides - Linear Bearings - Harmonic Transmission - Bearings-Motor / Drive Selection.

ELECTRONIC INTERFACE SUBSYSTEMS : TTL, CMOS interfacing - Sensor interfacing - Actuator

interfacing – solenoids , motors Isolation schemes- opto coupling, buffer IC's - Protection schemes – circuit breakers , over current sensing , resettable fuses , thermal dissipation - Power Supply - Bipolar transistors/ mosfets

Section C

ELECTROMECHANICAL DRIVES : Relays and Solenoids - Stepper Motors - DC brushed motors - DC

brushless motors - DC servo motors - 4-quadrant servo drives , PWM's - Pulse Width Modulation – Variable Frequency Drives, Vector Drives - Drive System load calculation.

MICROCONTROLLERS OVERVIEW : 8051 Microcontroller , micro processor structure - Digital

Interfacing - Analog Interfacing - Digital to Analog Convertors - Analog to Digital Convertors - Applications.

Programming –Assembly , C (LED Blinking , Voltage measurement using ADC).

Section D

PROGRAMMABLE LOGIC CONTROLLERS : Basic Structure - Programming : Ladder diagram -

Timers, Internal Relays and Counters - Shift Registers - Master and Jump Controls - Data Handling -

Analog input / output - PLC Selection - Application.

PROGRAMMABLE MOTION CONTROLLERS : Introduction - System Transfer Function - Laplace

transform and its application in analysing differential equation of a control system - Feedback

Devices :

Position , Velocity Sensors - Optical Incremental encoders - Proximity Sensors : Inductive , Capacitive , Infrared - Continuous and discrete processes - Control System Performance & tuning - Digital Controllers
- P , PI , PID Control - Control modes – Position , Velocity and Torque - Velocity Profiles – Trapezoidal
- S. Curve - Electronic Gearing - Controlled Velocity Profile - Multi axis Interpolation , PTP , Linear , Circular - Core functionalities – Home , Record position , Go to Position - Applications : SPM, Robotics.

TEXT BOOKS :

1. Mechatronics Electronics Control Systems in Mechanical and Electrical Engineering by W Bolton, Pearson Education Press, 3rd edition, 2005.
2. Mechatronics/M.D.Singh/J.G.Joshi/PHI.

REFERENCES :

1. Mechatronics Source Book by Newton C Braga, Thomson Publications, Chennai.
2. Mechatronics – N. Shanmugam / Anuradha Agencies Publisers.
3. Mechatronics System Design / Devdas shetty/Richard/Thomson.

IC-455-F INTELLIGENT INSTRUMENTATION FOR ENGINEERS

L T P
3 1 -

Theory : 100 marks
Class Work : 50 marks
Total : 150 marks
Duration of exam. : 3 hours

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section -A

INTRODUCTION:

Definition of an intelligent instrumentation system; feature of intelligent instrumentation; components of intelligent instrumentation; Block diagram of an intelligent instrumentation.

Section -B

INTERFACING INSTRUMENTS & COMPUTERS:

Basic issue of interfacing; Address decoding; Data transfer control; A/D converter; D/A converter; Other interface consideration.

Section -C

INSTRUMENTATION/ COMPUTER NETWORKS:

Serial & parallel interfaces; Serial communication lines; Parallel data bus; IEEE 488bus; Local area networks(LANs) : Star networks, Ring & bus networks, Fiber optic distributed networks, Field bus; Communication Protocols for very large systems: communication network rationalization.

Section -D

SOFTWARE FILTERS :

Description of Spike Filter, Low pass filter, High pass filter etc.

TEXT BOOK:

1. Principles of measurement & Instrumentation: Alan S. Moris; PHI

OR-401-F

OPERATIONS RESEARCH

L T P
3 1 0
Marks

Class Work : 50 Marks
Exam :100

Total : 150 Marks

Duration of Exam : 3 Hrs.

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section – A

Development – Definition– Characteristics and Phases – Types of models – operation Research models – applications.

ALLOCATION : Linear OPERATIONS-RESEARCH

Problem Formulation – Graphical solution – Simplex method – Artificial variables techniques -Two–phase method, Big-M method – Duality Principle.

Section – B

TRANSPORTATION PROBLEM – Formulation – Optimal solution, unbalanced transportation problem – Degeneracy. Assignment problem – Formulation – Optimal solution - Variants of Assignment Problem-Traveling Salesman problem.

REPLACEMENT : Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely, group replacement. staffing problem, equipment renewal problem.

Section – C

System Reliability: Introduction-Definition-Failure Rates-Bath-tub shaped failure rate(Hazard Rate)-Reliability of systems-series arrangement and parallel arrangement-methods of assuring reliability.

Section – D

Information Theory-Introduction, measure of Information, binary unit of information , entropy, properties of average measure of entropy, important relations for various entropies, set of axioms for an entropy function, uniqueness theorem, communication system, noiseless channel, channel capacity, efficiency and redundancy, mutual information, encoding.

TEXT BOOK :

1. OPERATIONS-RESEARCH / S.D.Sharma-Kedarnath

2. Introduction to O.R/ Taha/ Pearsons

REFERENCES:

1)Operation Research/A.P.VERMA/SK KATARIA AND SONS

2) Operations Research/P.K.GUPTA & D.S.HIRA

M.D. UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATION

B.Tech. IV YEAR (ELECTRONICS & INSTRUMENTATION ENGINEERING)

SEMESTER – VIII

'F' Scheme

EFFECTIVE FROM THE SESSION 2012-13

Sl. No.	Course No.	Subject	Internal Marks	External Marks	Total Marks
1.	EI- 402-F	Industrial Training/Institutional Project Work	150	150	300

Note:

The students are required to undergo Industrial Training or Institutional Project Work of duration not less than 4 months in a reputed organization or concerned institute. The students who wish to undergo industrial training, the industry chosen for undergoing the training should be at least a private limited company. The students shall submit and present the mid-term progress report at the Institute. The presentation will be attended by a committee. Alternately, the teacher may visit the Industry to get the feedback of the students.

The final viva-voce of the Industrial Training or Institutional Project Work will be conducted by an external examiner and one internal examiner appointed by the Institute. External examiner will be from the panel of examiners submitted by the concerned institute approved by the Board of Studies in Engg. & Technology. Assessment of Industrial Training or Institutional Project Work will be based on seminar, viva-voce, report and certificate of Industrial Training or Institutional Project Work obtained by the student from the industry or Institute.

The internal marks distributions for the students who have undergone Industrial Training consist of 50 marks from the industry concern and 100 marks by the committee members consisting of faculty members of concerned department of the parent institute.

The teachers engaged for Institutional Project work shall have a workload of 2 hours per group (at least 4 students) per week.