VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.-IV (Electronics Engg.)

Semester - VII

SCHEME FOR TEACHING & EXAMINATION
B.E.IV (Electronics Engg.) (New)

B.E.IV (Electronics) - 7th Semester		Teaching Scheme			Examination Scheme						
		L	T	P	Theory Exam		Practical/Quiz/Viva/T.W. etc.				
		Hrs.	Hrs.	Hrs.	University Exam.		University Exam.		Tutorial	Cont. Evalua-	Total Marks
Course	Course No.				Dura-tion	Marks	Dura-tion	Marks		tion	
					Hrs.		Hrs.				
Microwave Techniques	EC 701 EC	3	0	2	3	100	3	30	-	20	50
Digital Signal Processing	EC 702 EC	3	1	2	3	100	3	30	25	20	75
Electronic System Design	EC 703 EC	3	1	2	3	100	3	30	25	20	75
Modern Communication Systems Fiber Optics Communication	EC 704 EC EC 704 ECC	3	1	2	3	100	3	30	25	20	75
Electronic Instrumentation	EC 705 EC	2	1	2	3	100	3	30	25	20	75
Project Preliminaries	EC 706 EC	0	0	3	-	-	-	30*	-	20	50
	TOTAL :	14	4	13	-	500	-	180	100	120	400
Total Contact Hours : 31 Total Marks : 900											

- Internal Examination, Project Preliminaries is not to be considered as a passing head and evaluation is to be done by the Department.

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LIST OF ELECTIVES FOR ELECTRONICS

Sr. No.	Name of the Subject	Code
	GROUP - I (EC 81X EC)	
1.1	Telematics	EC 811 EC
1.2	Advanced Microprocessor	EC 812 EC
1.3	Programmable Logic Controllers & Distributed Control Systems.	EC 813 EC
1.4	Biomedical Instrumentation	EC 814 EC
1.5	Digital & HD TV Technology	EC 815 EC
1.6	Internet, Programming & Application	EC 816 EC
1.7	Fuzzy Logic in Control Systems	EC 817 EC
	GROUP - II (EC 82X EC)	
2.1	Mobile Communication	EC 821 EC
2.2	Advance Power Electronics	EC 822 EC
2.3	Advanced Analog Integrated Circuits	EC 823 EC
2.4	Process Instrumentation and Control	EC 824 EC
2.5	Radar And Navigational Aids	EC 825 EC
2.6	Computer based Information Processing	EC 826 EC
2.7	Micro controllers and Applications.	EC 827 EC

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LIST OF ELECTIVES FOR ELECTRONICS & COMMUNICATION

Sr. No.	NAME OF THE SUBJECT	CODE
	GROUP-I (EC 81X EC/ECC)	
1.1	Advanced Microprocessor	EC 812 EC/ECC
1.2	Biomedical Instrumentation	EC 814 EC/ECC
1.3	Digital & HD TV Technology	EC 815 EC/ECC
1.4	Informatics	EC 818 ECC
1.5	Digital Message Transmission	EC 819 ECC
1.6	Adaptive Signal Processing	EC 820 ECC
	GROUP-II (EC 82X EC/ECC)	
2.1	Radar and Navigational Aids	EC 825 EC/ECC
2.2	Digital Microwave Communication	EC 828 ECC
2.3	Telecommunication Switching Systems and Networks	EC 829 ECC
2.4	VLSI Circuits	EC 830 ECC
2.5	Image Processing	EC 831 ECC
2.6	Arificial Neural Networks	EC 832 ECC

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EC 701 EC : Microwave Techniques

	Lecture	Tutorial	Practical
Teaching Hours	3	0	2
Examination Scheme Marks	100	-	Cont. Evaluation : 20 Examination : 30

1. Microwave Transmission Lines : Transmission-line equations and solutions, reflections coefficient and transmission coefficient standing wave ratio, line impedance and admittance, Smith chart, impledance matching.

1. Microwave Waveguides and Components : Rectangular and circular waveguides, microwave cavities, microwave hybrid circuits, directional couplers, circulators and isolators.

1. Microwave Solid State Devices : Gunn diodes, RWH theory, modes of operation, microwave generation and amplification. Read diodes, IMPATT, TRAPATT, BARITT diodes, parametric devices.

1. Microwave Tubes : Klystrons, Travelling wave tubes, Magnetrons.

1. Application of Microwaves : Radar : Nature of Radar, Radar Equations, CW and FMCW Radar, MTI and Pulse Doppler Radar, Tracking Radar. Microwave Navigation : Overview, DME, TACAN, Instrument Landing System, GCA, Doppler Navigation, Satellite Navigation, Global Positioning System.

References :

1. Microwave Devices and Circuits by Samuel Y. Liao, PHI, 1995
2. Foundations for Microwave Engineering by Robert E. Collin, McGraw Hill (International Edition), 1996.
3. Elements of Electronics Navigation by N.S. Nagraja, TMH Pub . Co.
4. Introduction to Radar Systems by S. I. Skolnik, McGraw Hill (International Student Edition).

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EC 702 EC : Digital Signal Processing

	Lecture	Tutorial	Practical
Teaching Hours	3	1	2
Examination Scheme Marks	100	25	Cont. Evaluation : 20 Examination : 30

1. Introduction to Continuous-time Signals and Systems : Continuous-time signals, Continuous-time systems and their properties, Convolution representation of linear, time-invariant continuous-time systems, Convolution of continuous-time signals, Laplace transform and transfer function representation, Frequency response function, The Fourier series and Fourier transform
2. Discrete-time Signals and Systems : Discrete-time signals : Sequences, Discrete-time systems, Linear time-invariant systems, Convolution representation of linear time-invariant discrete-time systems, Convolution of discrete-time signals, Linear difference equations with constant coefficients, Realizations, Frequency-domain representation of discrete-time signals and systems
3. Sampling of Continuous-time Signals : Periodic sampling, Frequency-domain representation of sampling, Reconstruction of a band-limited signal, Discrete-time processing of continuous-time signals, Continuous-time processing of discrete-time signals, Changing the sampling rate using discrete-time processing
4. The Z-Transform : The Z-transform, Properties of the Z-transform, Transfer function representation, Inverse Z-transform, Z-transform applied to difference equations, The complex convolution theorem, Stability of discrete-time systems, Frequency response of discrete-time systems
5. The Discrete Fourier Transform : Discrete-Time Fourier Transform (DTFT), The Discrete Fourier series, The Fourier transform of periodic signals, Discrete Fourier Transform (DFT), Properties of the DFT, System analysis via the DTFT and DFT, Circular convolution, Linear convolution using the DFT, Implementation of the DFT using convolution
6. The Fast Fourier Transform (FFT) Algorithms : Decimation in time FFT, Introduction to radix-2 FFTs, Some properties of radix-2 decimation in time FFT, Decimation in frequency algorithm, Computing the inverse DFT by doing a direct DFT.
7. Introduction to Digital Filters : Recursive Digital Filters - Infinite Impulse Response (IIR) Filters : Analog approximations, Impulse invariant method, Bilinear transformation method, Matched Z-Transform method, Realizations,

Non-recursive Digital Filters - Finite Impulse Response (FIR) Filters : Fourier series method, Frequency-sampling method, Realizations, Direct realization of Digital Filters

8. Introduction to Digital Signal Processor Architecture and DSP chips : Design procedure for Digital Signal Processing hardware, Special purpose hardware for the FFT, Case study of Analog Devices Digital Signal Processors, Case study of Texas Instruments Digital Signal Processors
9. TMS320C2x Assembly Language Instructions:Memory address mode,instruction set,software Applicartion.
10. Applications of Digital Signal Processing : Applications in Speech technology : The Speech signal, Representation, Model of speech production, Digital transmission and storage of speech, Speech synthesis systems, Speaker verification and identification, Speech recognition systems, Applications in Image Processing : Introduction to the theory of two-dimensional signal processing, Two-dimensional signals and systems, Two-dimensional difference equations, Two-dimensional Z-transform, Two-dimensional DFT, Two-dimensional filter design, Image representation, enhancement, restoration, coding, compression, etc.
11. An introduction to the Theory of Multirate Signal Processing : Decimation by a factor of D, Interpolation by a factor of I, Sampling rate conversion by a rational factor I/D, Filter design and implementation for sampling rate conversion, Applications of Multirate Signal Processing

References :

1. Edward W. Kamen, *Introduction to Signals and Systems*, Macmillan Pub. Co., New York.
2. Alan W. Oppenheim & Ronald W. Schafer, *Discrete-time Signal Processing*, Prentice-Hall of India Private Limited, New Delhi.
3. Roman Kuc, *Introduction to Digital Signal Processing*, McGraw-Hill International Editions, Electrical Engineering Series.
4. John G. Proakis & Dimitris G. Manolakis, *Introduction to Digital Signal Processing*, Macmillan Publishing Co., New York.
5. Lawrence R. Rabiner & Bernard Gold, *Theory and Applications of Digital Signal Processing*, Prentice-Hall of India Private Limited, New Delhi.
6. Andreas Antoniou, *Digital Filters Analysis and Design*, Tata McGraw-Hill Publishing Company Limited, New Delhi.
7. Johnny Johnson, *Introduction to Digital Signal Processing*, Prentice-Hall of India Private Limited, New Delhi.

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EC 703 EC : Electronic System Design

	Lecture	Tutorial	Practical
Teaching Hours	3	1	2
Examination Scheme Marks	100	25	Cont. Evaluation : 20 Examination : 30

1. LINEAR POWER SUPPLIES : Basic operation, voltage regulator circuits, Dual – track voltage regulator, Power dissipation in series pass transistor, Out put resistance , load and line regulation protection circuit fold-back, thermal and crawbar, Three- terminal regulator (fixed regulator) voltage adjustment and current Boosting of fixed regulator merits and drawbacks of linear regulators.

1. SWITCHING POWER SUPPLY : Basic operations choice of switching frequency-operation and design of different types of switching regulators, buck type, boost type buck-boost, isolated multi-winding SMPS : push-pull, fold back and fly back configuration (discontinuous mode),Design of filter inductors and high frequency transformers, Feedback loop stabilization, Merits & Demerits of SMPs.

1. FUNCTION GENERATORS : Realization of functions : square, square root, log-antilog, sine & cosine, Analog Scheme using op-amps and analog multiplier ICs., Digital scheme using ADC, DAC, EPROM device and Microprocessors.

1. ELECTRONICS CONTROLLER : P,PI , PID Controllers- Realization for system with known parameters. Tuning of PID control parameters using decouple PID Model.

1. SPECIFIC APPLICATIONS : Schmitt Trigger, Static relay for system protection Clamping Circuit, Soft-Starters Peak Detectors

1. SCOPE OF ELECTRONIC DESIGN & MANUFACTURING : Introductory model of product, development, process developing, an integrated system approach to electronics design and manufacturing, Product Development and integrated testing, concept of reliability & testing and performance objectives.

1. INTRODUCTION TO STANDARDS & PATENTS : Procedures and methods for patent, legal aspects and patent right etc.

References :

1. Abraham I Pressman Switching Power Supply Design,– McGraw Hill –1992.

1. Gaikwad , Linear Electronics.

1. Mitchel & Mitchel (Jr.), Electronics Circuit Design, IInd Edition, 1995, PHI(EEE).

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Semester - VII

EC 704 EC : Modern Communication Systems

	Lecture	Tutorial	Practical
Teaching Hours	3	1	2
Examination Scheme Marks	100	25	Cont. Evaluation : 20 Examination : 30

A. FIBER OPTICS :

1. Introduction: Nature of Light, Basic Optical Laws and Definitions, Fiber Modes and Configurations, Fiber Materials, Fiber Fabrication, Fiber Optic Cables.
2. Signal Degradation in Optical Fibers : Attenuation, Signal Distribution in Optical Wave guides.
3. Optical Sources : LEDs, Laser Diodes.
4. Power Launching and Coupling : Coupling, Joints, Splicing, Connectors.
5. Photodetectors: Physical Principals of Photodiodes.
6. Digital Transmission Systems : Point-to-point Links, System Considerations, Link Powerbudget, Overview of Analog Links
7. Advanced Systems and Techniques : Wave Length Division Multiplexing, Local Area Networks.

B. SATELLITE COMMUNICATION :

1. Introduction : Orbltal, Geostationary Satellites, Orbltal Spacing, Satellite System Parameters, Link Equations and Link Budget.
2. Satellite Multiple- Access Arrangements : TDMA, FDMA, CDMA, Frequency Hopping and Channel Capacity.
3. Power – Efficient Digital Modulation Techniques : BPSK, QPSK, MSK
4. Spectrum – Efficient Digital Modulation Techniques : 8-psk, M – ary Systems
5. Error Detection and Correction : Introduction, Source Encoding, Block Codes Repetition codes, Linear Codes, Cyclic Codes, Convolutional Codes.
6. Satellite Earth Station : Antenna, LNA, HPA.

References :

1. Optical Fiber Communications by Gerd Kelser, McGraw Hill, International Edition, 1996.

1. Optical Communication Systems by Johan Gower, Prentice Hall of India, 1994

1. Advanced Electronics Communication Systems by Wayne Tomasi, Prentice Hall of India, 1996.

1. Digital Communications with Satellite Earth Station Engg. By FEHER, Prentice Hall, International, 1994

1. Satellite Communication by Gagliardi, Publication

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EC 704 ECC : FIBER OPTICS COMMUNICATION

	Lecture	Tutorial	Practical
Teaching Hours	3	1	2
Examination Scheme Marks	100	25	Cont. Evaluation : 20 Examination : 30

1. OVERVIEW OF OPTICAL FIBER COMMUNICATION ;

   Basic Network Information Rates, The Evalution of Fiber Optics Systems, Elements of an Optical Fiber Transmission Link.

2. OPTICAL FIBERS : STUCTURES, WAVE GUIDING & FABRICATION :

   Basic Optical Laws ans Definations, Optical Fiber Modes and Configurations, Mode Theory for Circular Waveguide (Key Modal Concepts), Fiber Materials, Fiber Fabrication, Fiber Optic Cables.

3. SIGNAL DEGRADATION IN OPTICAL FIBERS :

   Attenuation, Signal Distortion in Optical Waveguides.

4. OPTICAL SOURCES :

   LEDs, LASER Diodes.

5. POWER LAUNCHING AND COUPLING :

   Source-to Fiber Power Launching, Lensing Schemes, Fiber-to Fiber Joints, Fiber Splicing, Connectors.

6. PHOTODETECTORS :

   Physical Principles of Photodiode : PIN and Avalanche Photodiodes.

7. DIGITAL TRANSMISSION SYSTEMS :

   Point-to-Point Links System Considerations, Link Power Budjet, Rise-Time Budget.

8. WDM CONCEPTS AND COMPONENTS :

   Operational Principles of WDM, Passive Components, Tunable Sources, Tunable Filters.

9. OPTICAL AMPLIFIERS :

Basic Application And type of Optical Amplifier.

10. OPTICAL NETWORKS :

Basic Networks, SONET/SDH, Broadcast And Select WDM Networks, Wavelenght Routed Networks.

11. MEASUREMENTS :

Attenuation and Dispersion Measurements, OTDR Field Applications.

REFERENCES :

1. Optical Fiber Communication by Gerd Keiser, McGraw Hill International Editions, Third Edition, 2000.

2. An Introduction to Optical Fiber by Allen H. Cherian, McGraw Hill International Edition, 1995.

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EC 705 EC : Electronic Instrumentation

	Lecture	Tutorial	Practical
Teaching Hours	2	1	2
Internal Examination Scheme Marks	100	25	Cont. Evaluation : 20 Examination : 30

1. Introduction: Electronics Instrumentation-generalize approach for measurement, system configuration. Performance characteristics of measuring system. Marits Of electronics Instrumentation. Comparison of analog and digital Instrumentation.
2. Transducers and sensors :Classification of Transducers- Active, Passive, Analog, Digital. Transducers-Temperature , Electromagnetic , Capacitive, Metallic and Semiconductor strain gages.
3. Single conditioning :Instrumentation Amplifier, Transducer bridge, V/I controller, I/V controller , V/F controller , F/V controller , Two wire 4 to 20 mA Transmitter , Leniarization Technique , Filtering – antialiasing filter ,Active filter ,switch capacitor filter. Noise reduction- Capacitive , Inductive and Conductive noise coupling ,Improvement of Signal to Noise ratio by synchronous detection and signal averaging.
4. Isolation Techniques: Transformer isolation, Optical isolation , Hall sensors – Measurement of voltage ,current and power using Hall sensors.
5. Data Acquisition and Conversion : Analog signal processing – Sample and Hold circuits, Sampling Theorem, Relation between ADC resolution and sampling rate, Analog mux and analog Channel expansion , A/D converter, Digital mux and Digital channel expansion . D/A converter and analog / Digital demux.
6. Display and Recording Devices: Bargraph display, Seven segment and dot-matrix display , Character generator , Multiplex display and digital Recorder

References :

1. C.S . Rangan : Instrumentation Devices And Systems. TMH, 1990.
2. Copper W.D :Electronics Instrumentation and Measurement Techniques , PHI(EEE)
3. A.J.Bowels : Digital Instrumentation , Mc-Graw Hill ,1986

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EC 706 EC : Project Preliminaries

	Lecture	Tutorial	Practical
Teaching Hours	0	0	3
Internal Examination Scheme Marks	-	-	Cont. Evaluation : 20 Examination : 30

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