M.E. Electronics & Telecommunication

(Digital Electronics)

The scheme of teaching & examination as per university syllabus applicable to ME Electronics & Telecommunication (Digital Electronics) will be as follows.

STRUCTURE OF
M.E. ELECTRONICS AND TELECOMMUNICATION
(DIGITAL ELECTRONICS)
SEMISTER: I

Sr. No.	Subject	Teaching Scheme Hours/week		EXAMINATION SCHEME				
		Lectures	Tutorial	Paper duration hours	Maximum marks			
					Paper	Term work	Practical	Oral
1	Advanced Instrumentation System	3	1	3	100	50	-	-
2	Advanced Digital Signal Processing	3	1	3	100	50	-	-
3	Digital System Design	3	1	3	100	50	-	-
4	VLSI Design	3	1	3	100	50	-	-
5	Elective -I	3	1	3	100	50	-	-
Total		**15**	**5**		**500**	**250**		
Grand Total		**20**			**750**			

List of Subjects for Elective – I

1. Parallel Computing
2. Biomedical Instrumentation
3. Wireless & Mobile Communication

STRUCTURE OF
M.E. ELECTRONICS AND TELECOMMUNICATION
(DIGITAL ELECTRONICS)
SEMISTER: II

Sr. No.	Subject	Teaching Scheme Hours/week		EXAMINATION SCHEME				
		Lectures	Tutorial	Paper duration hours	Maximum marks			
					Paper	Term work	Practical	Oral
1	Image Processing & Pattern Recognition	3	1	3	100	50	-	-
2	Embedded System Design	3	1	3	100	50	-	-
3	Microelectronics Circuit Design	3	1	3	100	50	-	-
4	Advanced Computer Network	3	1	3	100	50	-	-
5	Elective -II	3	1	3	100	50	-	-
Total		**15**	**5**		**500**	**250**		
Grand Total		**20**			**750**			

List of Subjects for Elective – II

1. Advanced Digital Communication.
2. Artificial Intelligence
3. Modeling and Simulation Techniques

STRUCTURE OF
M.E. ELECTRONICS AND TELECOMMUNICATION
(DIGITAL ELECTRONICS)
SEMISTER: III

Sr. No.	Subject	Teaching Scheme Hours/week		EXAMINATION SCHEME				
		Lectures	Practical	Paper duration hours	Maximum marks			
					Paper	Term work	Practical	Oral
1	Seminar –I	02	-	-	-	50	-	-
2	Seminar –II	02	-	-	-	50	-	-
3	Project Stage - I	-	04	-	-	100	-	-
Total		**-**	**-**	**-**	**-**	**200**	**-**	**-**
Grand Total		**-**		**-**	**200**			

STRUCTURE OF
M.E. ELECTRONICS AND TELECOMMUNICATION
(DIGITAL ELECTRONICS)
SEMISTER: IV

Sr. No.	Subject	Teaching Scheme Hours/week		EXAMINATION SCHEME				
		Lectures	Practical	Paper duration hours	Maximum marks			
					Paper	Term work	Practical/ Presentation	Oral
1	Project Stage - II	-	08	-	-	100	-	-
2	Final Stage Project	-	-	-	-	-	100	100
Total		**-**	**-**	**-**	**-**	**100**	**100**	**100**
Grand Total		**-**		**-**	**300**			

Grand Total : 2000

Rules and Regulations for M.E. in Electronics & Telecommunication (Digital Electronics)

1. The postgraduate degree in engineering of duration of 2 years (4 terms) shall be designated as Master of Engineering Electronics & Telecommunication (Digital Electronics)

2. A candidate may be permitted to register him/her self for the M.E. degree in Electronics & Telecommunication (Digital Electronics) under the faculty of engineering & technology of North Maharashtra University Jalgaon, only if the candidate holds a bachelor's degree in Engineering & technology of North Maharashtra University , Jalgaon or its equivalent in Electronics & Telecommunication./ Electronics & Communication. / Electronics / Industrial Electronics / Instrumentation / Electrical / Computer / computer science /Information Technology or its equivalent. recognized by AICTE & North Maharashtra University , Jalgaon.

3. Preference will be given to graduates of North Maharashtra University, Jalgaon.

4. The student shall be admitted to second term of the first year if his/her first term is granted.

5. The student shall be admitted to the second year if his/her second term of first year is granted. However he/she will not be allowed to submit his / her thesis/ dissertation unless he/ her has cleared all the theory papers & has completed all the presentation of first term of second year.

6. Every student will be required to produce a record of assignment given and laboratory work in the form of journal, duly certified for satisfactory completion of the term work by the concerned teacher & head of the department.

7. A student whose term is not granted on account of unsatisfactory attendance / term work is required to repeat the semester.

8. Each student is required to present seminar –I in the first term of second year on the state of the art of the topic of his/her choice.

9. The presentation will be evaluated by departmental committee consisting of guide and faculty members of the department appointed by Principal as per the recommendation of the Head of the Department.

10. Each student is required to deliver a seminar-II in the first term of second year on the work done and proposed to be done for his/her dissertation and demonstrate the status of his/ her dissertation work done for project stage-I , which will be evaluated by committee consisting of guide and 2 faculty members of the department appointed by the Director/Principal of the college as per the recommendation of the Head of the Department.

11. Minimum passing marks for all theory shall be 40% and for Term work and seminar and project presentation shall be 50%. A candidate is required to get an average of 50% marks in aggregate in each term.

12. For project stage –II each student has to deliver the seminar in the second term of second

year and demonstrate the complete work done in his dissertation and minimum one paper is desirable to be present / publish in the international conference / Journal or minimum two paper are to be present / publish in the national conference / Journal.. The dissertation work will be evaluated by the committee consisting of guide and 2 faculty members of the department appointed by the Director/Principal of the college as per the recommendation of the Head of the Department.

13. The final stage of the project will be evaluated by examiners appointed by university one of which should be guide.

14. The class will be awarded on the basis of marks of all four terms, giving equal weightage to all terms as shown below…

a. 50 to less than 60% marks in aggregate - II class
b. 60 to less than 70% marks in aggregate - I class
c. 70% & above marks in aggregate - I class with distinction.

13. Each student is required to complete his/her master's degree within five academic years from the date of admission, failing which he/she will be required to take fresh admission in first year.

NORTH MAHARASHTRA UNIVERSITY JALGAON
M.E. ELECTRONICS AND TELECOMMUNICATION (Digital Electronics)
W.E.F : 2009- 10
Term – I

ADVANCED INSTRUMENTATION SYSTEM

Teaching scheme:	Examination scheme:
Lectures: 3 hrs / week	Theory Paper : 100 Marks (3 Hours)
Tutorial: 1 hrs / week	Term Work : 50 Marks

Digital Instruments:- Introduction, Digital Panel Meters, Digital Frequency Meters, Basic Circuit for Frequency measurements, High Frequency measurements, Digital Measurements of time, Period Measurement, Ratio and Multiple Ratio Measurement, Universal Counter, Digital Measurement of Mains Frequency.

Signal Analyzer :- Wave Analyzer, Harmonic Distortion Analyzer, Spectrum Analyzer, Network Analyzer, Logic Analyzer, Protocol Analyzer.

PC Based Data Acquisition System: - PC Based Instrumentation System, Introduction to PC Based Data Acquisition System.
Introduction to Smart Sensors:- Digital Sensors, Case Studies of Real Time PC Based Instrumentation System, Virtual Instruments, Intelligent Instruments.

Automated Measurement System :- Need And Requirement Automatic Test Equipments (ATE) Computer Based And Computer Controlled ATE Switches in ADTE , ATE For PCB Testing, ATE for Component Testing, IEEE- 488 Electronic Instruments BUS Standards.

Computer Control :- Hierarchy of Computer Control For Industry , Direct Digital Control, Distributed Digital Control, Supervisory Control And Data Acquisition System (SCADA), NC, CNC.

Introduction to process control :- Control System, Process Control Principles, Servo mechanism, Discrete Control System, Process Control Block Diagram , Anlog and Digital Processing , Feedback Control, Basic Principle of Single Loop Controller , Two Position Control, Mutiposition Control, Proportional ,Integral , Derivative Controller (Overview), Multivariable Control , Cascade Control, Ratio Control , Feed Forward Control.

Control Modes:- Close loop Response , Control loop transfer function, Analysis of Chemical Reactor.

Intelligent Controller :- Programmable Logic Controller, PLC Programming Technique , Fuzzy Logic Controller.
Industrial Control Application:- Cement Plant , Thermal Power Plant, Irrigation Cannal Management, Steel Plant.

Note : Term Work is based on above syllabus.

References :

1. Clyde E. Coombs, Electronic Instruments Handbook(3/e), McGraw Hill International.
2. Mc Lachlan & Buchla, Applied Electronic Instrumentation & Measurement , 1992, Prentice Hall International..
3. Pallas Areny & Webstor, Sensors & Signals Conditioning , (2/e)1994, J.Wiley & sons
4. Critis Johnson, Process control Instrumentation Technology, PHI
5. H.S.Kalasi, Electronic Instrumentation (2/e), Tata McGraw Hill International
6. Bela G. Liptak, Butterworth Heinemann, Instrument Engineer's Handbook (3/e) Process Control,
7. Aibert D. Helfric, William D. Cooper, Modern Electronic Instrumentation And Measurement Technique
8. Krishna Kant, Computer Based Industrial Control.

NORTH MAHARASHTRA UNIVERSITY JALGAON
M.E. ELECTRONICS AND TELECOMMUNICATION (Digital Electronics)
W.E.F : 2009- 10
Term – I

ADVANCED DIGITAL SIGNAL PROCESSING

Teaching scheme:
Lectures: 3 hrs / week
Tutorial: 1 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)
Term Work : 50 Marks

Discrete time signal & systems, its representation, types of discrete time system,DFT, IDFT, FFT(DIF&DIT). Realization of FIR and IIR filter

Multirate digital signal processing-decimation by factor D, interpolation, filter design & implementation, sampling rate conversion, application of multirate signal processing.

Power spectral estimation- parametric & nonparametric method for power spectral estimation, minimum variance, and realization of FIR & IIR filters.

Least mean square Adaptive filter: Overview of the structure, operation of the LMS algorithm, LMS adaptive algorithm, statistical LMS theory, Comparison of the LMS algorithm with the steepest Descent algorithm, Computer experiment on adaptive prediction, Computer experiment on adaptive equalization, Computer experiment on a minimum- variance distortion less response beam former, Directionality of convergence of the LMS algorithm for Nonwhite Inputs, Robustness of the LMS filter, Upper bound on the step size Parameters for Different Scenarios, Transfer function approach for deterministic input summary problems.

Design of digital filters-symmetric & antisymmetric, linear phase, optimum, Equiripple, FIR differentiation, Hilbert's transformers.

Design of IIR filters-impulse invariance, bilinear transformation, matched transformation, frequency transformation in analog & digital domain.

Design of digital filters based on least square method.

Application of DSP to speech processing & radar signal processing.

Introduction to TMS320c62XX DSP processors.

Note : Term Work is based on above syllabus.

References :

1. John Proakis, Digital Signal Processing Prentice Hall
2. A.V.Oppenhiem & R.W.Schafer, Digital Signal Processing - Prentice Hall
3. L.R.Rabiner & B.Gold,Theory & application of digital signal processing-Prentice Hall
4. A.Antiniou, Digital Filters; analysis, design & application- Mcgraw Hill
5. Salivahanan,vallavaraj,gnanapriya, Digital Signal Processing-TMH
6. S.K.Mitra, Digital Signal Processing - TMH

NORTH MAHARASHTRA UNIVERSITY JALGAON
M.E. ELECTRONICS AND TELECOMMUNICATION (Digital Electronics)
W.E.F : 2009- 10
Term – I

DIGITAL SYSTEM DESIGN

Teaching scheme:	Examination scheme:
Lectures: 3 hrs / week	Theory Paper : 100 Marks (3 Hours)
Tutorial: 1 hrs / week	Term Work : 50 Marks

Design of synchronous and asynchronous sequential logic circuits working in the fundamental mode and pulse mode. Essential hazards Unger's theorm. Map entered variable and synthesis of random logic. Fault detection and error correction.

Register- transfer level systems, Execution Graph, Organization of System, Implementation of RTL Systems, Analysis of RTL Systems, Design of RTL Systems.

Data Subsystems, Storage Modules, Functional Modules, Data paths, Control Subsystems, Micro programmed Controller, Structure of a micro programmed controller, Micro instruction Format, Micro instruction sequencing, Micro instruction Timing, Basic component of a micro system, memory subsystem.

I/O subsystem, Processors, Operation of the computer and cycle time. Binary Decoder, Binary Encoder, Multiplexers and Demultiplexers, Floating Point Arithmetic-Representation of Floating Point Number, Floating Point Multiplication.

Logic simulation: General fault simulation techniques, statistical fault analysis. Testing for single stuck fault: Basic issues, ATG for SSF in combined circuits. ATG for SSFs in sequential circuits. PLA testing.

Design for Testability: Classical testability scan design, compressing tech. built in self test logic level diagnosis, self checking design.

Specific digital system: Deign such as digital IS tester Microcontroller cards, PC add on cards design, PLA based product design.

Note : Term Work is based on above syllabus.

References:

1. M. Ercegovac, T. Lang and L.J. Moreno, "Introduction to Digital Systems", Wiley,2000
2. John F. Wakerly,"Digital Design principles and practices",3rd edition, PHI publications.
3. Melvin A Breuer, Arthur D Friedmen, MironAbra MOVICI jaico Publishing.

4. House- Digital system testing and testable design.
5. B Holdsworth Digital Logic Design.
6. Puri V.K Digital Electronics
7. Z. Navabi, " VHDL-Analysis and Modeling of Digital Systems", TMH
8. Norman - Digital Logic design principal John Wiley Pub.
9. Samual – Digital Circuit logic design –PHI.
10. Charles H. Roth, "Digital system design using VHDL", Thomson Publication.
11. Balabanian,"Digital logic design principles",Wiley publication.
12. Stephen Brown, "Fundamentals of digital logic", TMH publication.

NORTH MAHARASHTRA UNIVERSITY JALGAON
M.E. ELECTRONICS AND TELECOMMUNICATION (Digital Electronics)
W.E.F : 2009- 10
Term – I

VLSI DESIGN

Teaching scheme:
Lectures: 3 hrs / week
Tutorial: 1 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)
Term Work : 50 Marks

Review of VHDL Verilog Programming, Hardware modeling with Verilog / VHDL, different verilog /VHDL constructs, and Logic Synthesis. Levels of abstraction, Elements (Data flow, Behavioral, Structural, Mixed and switch level Description).

simulation process, types of simulators FSM modeling, test benches, generics & attributes, synthesis tools features & optimization in VHDL, Synthesis guidelines, Timing issues: terminology, flow diagram, clock, gated clock, setup & hold time, violation,Meta stability, Static & Dynamic timing analysis.

CMOS & Bi-CMOS logic families & PLD architecture, Power dissipation, noise and ESD issues, clock distribution, signal connections, synchronous and asynchronous design features, and memory system design. CMOS systems Design, CMOS Testing. Classification of CPLD architecture, CPLD 9500 series, Xilinx FPGA –XC4000 series,

Designing steps in ASIC, Physical Design flow, Different type of ASIC, CAD Tools, System Partitioning, Estimating ASIC size, Power dissipation, FPGA partitioning methods,

Floor planning, Placement Physical design flow; Information Formats; global routing, detailed routing; special routing; circuit extraction and DRC

Note : Term Work is based on above syllabus.
References :

1. Douglas Perry, VHDL - McGraw Hill Publication
2. Janic Bergerson, VHDL Using Testbenches
3. Yu. Chin Hsu, K. Tsai, VHDL Modeling for Digital Design Synthesis.- Kluwer publishers.

4. Xilinx PLD data manual
5. Michael John sebastiab smith, “Application specific IC”, Addison Wesley publication.
6. K. K. Parhi , “VLSI Digital signal processing systems Design & Implementation” John Wiley & Sons
7. Neil Weste and Eshraghian, “Principles of CMOS VLSI Design “(Second Edition) Pearson Education Asia (Addison – Wesley Publication Company)
8. James E Buchnan – BiCMOS-CMOS system design McGraw Hill Publication.

NORTH MAHARASHTRA UNIVERSITY JALGAON
M.E. ELECTRONICS AND TELECOMMUNICATION (Digital Electronics)
W.E.F : 2009- 10
Term – I

Elective – I

PARALLEL COMPUTING

Teaching scheme:	Examination scheme:
Lectures: 3 hrs / week	Theory Paper : 100 Marks (3 Hours)
Tutorial: 1 hrs / week	Term Work : 50 Marks

Parallel Computer Models: The state of computing, Multiprocessors and multi-computers, Multivector and SIMD computers, Architectural development tracks

Program And Network Properties: Conditions of parallelism, Data and resource dependences, Hardware and software parallelism, Program partitioning and scheduling, Grain size and latency, Program flow mechanisms, Control flow versus data flow, Data flow architecture, Demand driven mechanisms, Comparisons of flow mechanisms

System Interconnect Architectures: Network properties and routing, Static interconnection networks, Dynamic interconnection Networks, Multiprocessor system interconnects, Hierarchical bus systems, Crossbar switch and multiport memory, Multistage and combining network.

Processors and Memory Hierarchy: Advanced processor technology, Instruction-set Architectures, CISC Scalar Processors, RISC Scalar Processors, Superscalar Processors, VLIW Architectures, Vector and Symbolic processors Memory Technology: Hierarchical memory technology, Inclusion, Coherence and Locality, Memory capacity planning, Virtual Memory Technology.

Backplane Bus System: Backplane bus specification, Addressing and timing protocols, Arbitration transaction and interrupt, Cache addressing models, direct mapping and associative caches.

Pipelining: Linear pipeline processor, Nonlinear pipeline processor, Instruction pipeline design, Mechanisms for instruction pipelining, Dynamic instruction scheduling, Branch handling techniques, Arithmetic Pipeline Design, Computer arithmetic principles, Static arithmetic pipeline, Multifunctional arithmetic pipelines.

Vector Processing Principles: Vector instruction types, Vector-access memory schemes.

Synchronous Parallel Processing: SIMD Architecture and Programming Principles, SIMD Parallel Algorithms, SIMD Computers and Performance Enhancement

Note : Term Work is based on above syllabus.

References:

1 Kai Hwang, "Advanced Computer Architecture", Parallelism, Scalability, Programmability", McGraw Hill Inc. Ed. 1993.
2 V. Rajaranam & C.S.R.Murthy, "Parallel Computer"; PHI.
3 William Stallings, "Computer organization & Architecture", PHI, New Delhi, 6th edition.
4 Dezso'Sima, "Kalsuk'Advanced computer Architectures", Terence Fountain & Peter Pearson's Edation. (2nd Edition)
5 Hwang and Degroot, "Parallel Processing for Supercomputers and AI", (Eds) McGraw Hill.
6 J. P. Hayes, "Computer Architecture And Organization"; MGH.
Harvey G. Cragon, "Memory System and Pipelined Processors"; Narosa Publication.
7 R. K. Ghose, Rajan Moona & Phalguni Gupta, "Foundation of Parallel Processing"; Narosa Publications. Kai Hwang and Zu, "Scalable Parallel Computers Architecture"; MGH.

NORTH MAHARASHTRA UNIVERSITY JALGAON
M.E. ELECTRONICS AND TELECOMMUNICATION (Digital Electronics)
W.E.F : 2009- 10
Term – I

Elective - I

BIOMEDICAL INSTRUMENTATION

Teaching scheme:
Lectures: 3 hrs / week
Tutorial: 1 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)
Term Work : 50 Marks

Measuring, Recording and Monitoring Instruments

Anatomy and Physiology, Physiological Systems of the Body, Basic Medical Instrumentation System, Performance Requirements of Medical Instrumentation System, Intelligent Instrumentation System, General Constraints in Design of Medical Instrumentation System, Regulation of Medical Devices.

Physiological transducers: Displacement, position and motion transducers, Pressure transducers, Transducers for Body Temperature Measurement, Photoelectric transducers, Optical Fibre sensors, Biosensors

Recording systems: Basic Recording systems, Biomedical signal Analysis Techniques, Signal Processing Techniques, Potentiometric Recorders, Digital Recorders, Instrumentation tape Recorders,

Biomedical Recorders: Electrocardiograph, Vectorcardiograph (VCG), Phonocardiograph (PCG), Electroencephalograph (EEG), Electromyograph (EMG), Other Biomedical Recorders, Biofeedback Instrumentation

Patient Monitoring Systems: Bedsides Patient Monitoring Systems, Central Monitors, Measurements of Heart Rate, Measurements of Pulse Rate, Blood Pressure Measurement, Measurement of Temperature, Measurement of Respiration rate

The Matched Filter, Detection of the P Wave,Homomorphic Filtering, Application- ECG Rhythm Analysis, Identification of Heart Sounds, Waveshape and waveform Complexity, Analysis of Event-related Potentials, Morphological Analysis of ECG Waves, Envelope Extraction and Analysis of Activity, Application- Normal and Ectopic ECG Beats, Analysis of Exercise ECG.

Modern Imaging Systems: X-ray Machines and Digital Radiography Portable and mobile X-ray units, Digital Radiography, X-ray Computed Tomography, Computed Tomography, System components, Gantry Geometry, Patient Dose in CT Scanners, Nuclear Medical Imaging System, Radiation Detectors, Pulse Height Analyzer, Uptake Monitoring Equipment, Radio-isotope Rectilinear Scanner, The

Gamma Camera, Emission Computed Topography (ECT) Single Photon Emission Computed Topography (SPECT), Positron Emission Topography (PET scanner)
Ultrasonic Imaging Systems: Diagnostic Ultrasound, Medical Ultrasound, Basic Pulse-echo Apparatus, A-Scan, B-Scanner.
Laser Applications In Biomedical Field: The laser, Pulsed Ruby laser, ND-YAG laser, Helium –Neon Laser, Argon Laser, CO2 Laser, Excimer Lasers, Semiconductors Laser, Laser Safety

Note : Term Work is based on above syllabus.

References:
1. Cromwell - Biomedical Instrumentation, Pearson
2. Khandpur - Handbook of Biomedical Instrumentation
3. Webster - Biomedical Instrumentation, Wiley
4. R. M. Rangayyan "Biomedical Signal Analysis- A case study approach", Wiley Publications.
5. Eugene N Bruce "Biomedical signal processing and signal modeling", Wiley publications.

NORTH MAHARASHTRA UNIVERSITY JALGAON
M.E. ELECTRONICS AND TELECOMMUNICATION (Digital Electronics)
W.E.F : 2009- 10
Term – I

Elective - I

WIRELESS & MOBILE COMMUNICATION

Teaching scheme:	Examination scheme:
Lectures: 3 hrs / week	Theory Paper : 100 Marks (3 Hours)
Tutorials: 1 hrs / week	Term Work : 50 Marks

Basics: History of wireless communication, and future trends, Wireless Generations and Standards, Cellular Concept and Cellular System Fundamentals, Trunking Cell Splitting and Sectoring, Mobile Radio signal propagation, path loss and channel models.

Speech coding for wireless system and application like PCM, DPCM, DM, Vocoder & Linear Predictive coding. Performance comparison.

Wireless LAN
IEEE802-11Hiper LAN, Bluetooth, Adhoc Network: Characteristic, Performance issue, Routing in mobile host.

Wireless Networking:
Difference between wireless & fixed telephone n/w, development, transmission hierarchies, traffic routing, wireless data services, common channel signaling, ISDN, SS7, global cellular network, Interoperability, PCS/PCNs, Protocols for n/w access and n/w data base, UMTS.

Wireless systems and standards:
AMPS, ETACS, United state of digital cellular, (IS 54 and IS 136) GSM, CDMA (IS95), CT2 Standards for cordless telephone, Digital European cordless telephone , PACs, PDC, Personal handy phone systems, US PCS & ISM bands, US wireless cable TV, IEEE802.11.

Note : Term Work is based on above syllabus.

References:

1. Walker, J.: Mobile Information Systems. Artech House, Inc. 1990, Boston London
2. Mehrotra, A.: GSM System Engineering. Artech House, Inc. 1997, Boston London
3. Redl, S.M., Weber, M.K., Oliphant, M.W.: An Introduction to GSM. Artech House, Inc. 1995, Boston London
4. Feher, Wireless Digital Communication- 1991, PHI.
5. Vijay K. Garg, and J.E. Wilkes, Principles & applications of GSM –1999 – Prentice hall PTR.
6. Roger L. Freeman, Telecom Transmission handwook 4th ed 1998 John Wiley & Sons. Inc. New York.
7. Lee, Mobile Cellular Telecomm, 1995 Mc Graw Hill Inc.
8. J. Schiller, Mobile Communication, Addision Wiley
9. William C.Y. Lee, Mobile Comm. Design Fundamental. John wiley.
10. Mark Ceampa, Design & Implementation of Wireless LANs, Thomson Learning.

NORTH MAHARASHTRA UNIVERSITY JALGAON
M.E. ELECTRONICS AND TELECOMMUNICATION (Digital Electronics)
W.E.F : 2009- 10
Term – I I

IMAGE PROCESSING AND PATTERN RECOGNITION

Teaching scheme:
Lectures: 3 hrs / week
Tutorial: 1 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)
Term Work : 50 Marks

Digital Image fundamentals : Basic Image Processing steps, image acquisition, presentation of gray scale and modeling. Human visual perception, sampling and quantization, basic relationships between pixels. Histogram analysis and equalization, geometric image

Applications of pattern recognition, statistical decision theory, image processing and analysis.

Probability: Introduction, probability of events, random variables, Joint distributions and densities, moments of random variables, estimation of parameters from samples, minimum risk estimators Statistical Decision Making: Introduction, Baye's Theorem, multiple features, conditionally independent features, decision boundaries, unequal costs of error, estimation of error rates, the leaving-one—out technique. Characteristic curves, estimating the composition of populations.

Nonparametric Decision Making: Introduction, histograms, Kernel and window estimators, nearest neighbor classification techniques, adaptive decision boundaries, adaptive discriminate Functions, minimum squared error discriminate functions, choosing a decision making technique.

Clustering: Introduction, hierarchical clustering, partitional clustering Artificial Neural Networks, PCA, ICA, SVM.

Note : Term Work is based on above syllabus.

References:

1) R. C. Gonzalez & Woods, "Digital Image Processing" – Addison Wesley IIIrd Ed.
2) A. K. Jain, "Fundamentals of Digital Image Processing"– Prentice Hall Inc.
3) Robert Jschalkoff, "Digital Image Processing & Computer vision : An introduction to theory & Implementation"– John wiley & Sons Inc.
4) K. R. Castleman, "Digital Image Processing" – PHI
5) W. K. Pratt, "Digital Image Processing" .(3 Ed.) John.Wiley.
6) B. Chanda and D.Mujumdar,"Digital Image Processing & Analysis".-PHI, New Delhi, 2000.

NORTH MAHARASHTRA UNIVERSITY JALGAON
M.E. ELECTRONICS AND TELECOMMUNICATION (Digital Electronics)
W.E.F : 2009- 10
Term – I I

EMBEDDED SYSTEM DESIGN

Teaching scheme:
Lectures: 3 hrs / week
Tutorial: 1 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)
Term Work : 50 Marks

Embedded system Introduction:
Introduction to Embedded System, History, Design challenges, optimizing design metrics, time to market, applications of embedded systems and recent trends in embedded systems, embedded design concepts and definitions, memory management, hardware and software design and testing, communication protocols like SPI, SCI, I2C, CAN etc

System Architecture:
ARM7/ARM9 architecture, instruction set, thumb Instruction set, Pipeline, memory management, Bus architecture, Programming concepts, Embedded programming in c and C++.

Multiprocessors Scheduling: Model of multiprocessor & distributed systems, Multiprocessor priority ceiling protocol, Elements of scheduling algorithms for end-to-end periodic tasks, Schedulability of fixed priority end-to-end periodic tasks, end-to-end tasks in heterogeneous systems.

Real Time systems: Characterizing real time systems & tasks, Performance measures, Estimating program runtimes, Task assignment & scheduling, Real time operating systems (RTOS), Task management, Race condition, Inter-task communication, Implementation aspects & estimation modeling in embedded systems, Validation & debugging of embedded systems, Real time communication, Hardware-software co-design in an embedded system, Applications of Real time systems.

Note : Term Work is based on above syllabus.

References:
1. Krishna & Shin, Real -Time Systems, (McGraw Hill International)
2. Rajkamal, Embedded systems, (Tata - McGraw Hill)
3. Valvano, Embedded Microcomputer systems, (Thomson Delmar publishing)

4. Atmel/ARM Data books.
5. Iyer &Gupta, Embedded Real Time Systems Programming, (Tata McGraw Hill)
6. Lewis Daniel, Fundamentals of Embedded software, (Prentice Hall India)
7. Jane Liu, Real Time Systems, (Pearson India low cost edition)

NORTH MAHARASHTRA UNIVERSITY JALGAON
M.E. ELECTRONICS AND TELECOMMUNICATION (Digital Electronics)
W.E.F : 2009- 10
Term – I I

MICROELECTRONICS CIRCUIT DESIGN

Teaching scheme:	Examination scheme:
Lectures: 3 hrs / week	Theory Paper : 100 Marks (3 Hours)
Tutorial: 1 hrs / week	Term Work : 50 Marks

Types of modeling, Models of diode, BJT and FET, CMOS device modeling: Simple MOS Large-signal Model, Simple MOS Small-signal Model,
Analog IC Design : Differential Amplifier, Cascode Amplifer, Current Amplifiers, Output Amplifers, High gain amplifier Architecture,
Operation Amplifier Design of CMOS op-amp, Compensatio of op-amps,
Design of two stage op-amps, PSRR of two stage op-amps, Cascode op-amps, Simulation and Measurement of Op-amps, Micromodels of Op-amps, Switch Capacitor Circuits, Switch Capacitor Amplifiers, Switch Capacitor Integrator, z Domain Models of two phase switched capacitor circuits, First and Second order switched capacitor circuits, Switched capacitor filter.
High frequency amplifier, Mixer, R.F. Power amplifier, Phase- Locked Loops.

Note : Term Work is based on above syllabus.

References:

1) Phillip E. Allen and Douglas R. Holberg, CMOS Analog Circuit Design,2nd ed. New York : Oxford University Press, 2004
2) Thomas H. Lee, "The Design of CMOS Radio – Frequency Integrated Circuit", Cambridge University Press
3) B. Razavi "RF Microelectronics" PHI 1998
4) R. Jacob Baker, H.W. Li, D.E. Boyce " CMOS Circiut Design, layout and Simulation"
PHI 1998
5). Y.P. Tsividis "Mixed Analog and Digital Devices and Technology" TMH 1996

NORTH MAHARASHTRA UNIVERSITY JALGAON
M.E. ELECTRONICS AND TELECOMMUNICATION (Digital Electronics)
W.E.F : 2009- 10
Term – I I

ADVANCE COMPUTER NETWORK

Teaching scheme:
Lectures: 3 hrs / week
Tutorial: 1 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)
Term Work : 50 Marks

Review of computer networking concepts
Topology, LAN, WAN, MAN, Internet, OSI/ISO, TCP/IP reference models, Point to point protocols. ARQ: Retransmission strategies. Functional elements : Multiplexing, Switching , Networks Management & traffic controls. Delay models in Data Networks Switching techniques: Performance measures & architectural issues.

Internetworking
TCP/IP Internet architecture, IPV4, IPV6, IP addressing & related issues, IP address resolution techniques (ARP). IP datagram & forwarding, routing algorithms.

Multiple access techniques
ALOHA, CSMA, CSMA/CD, CSMA/CA, CDMA, OFDM, Delay throughput characteristics, WLAN-Protocols, multiple access, Ad-hoc networks, Bluetooth Specifications, WAP.

Network security issues
Ciphers, DES, Public key cryptography, RAS algorithm, Digital Watermarking, Attacks and Counter Measures , Service Authentication Performa.

Note : Term Work is based on above syllabus.

References:

1) Dimitri Bertisekas & Robert Gallager, “Data Networks” PHI
2) Gerd E Kieser, “Local Area Networks”,– Mc-Graw-Hill
3) D.E.Comer, “Computer Networks and Internetworking” Pearson Education
4) William Stallings, “Cryptography and Network Security: Principles and Practice”, Pearson Education

5) Steele, “GSM, CDMA and 3G Systems” , Wiely Students Edition
6) Anurag kumar, D. Manjunath & Joy Kuri– Morgn, “Communication Networking” An analytical approach” – Kaufmann publishers

NORTH MAHARASHTRA UNIVERSITY JALGAON
M.E. ELECTRONICS AND TELECOMMUNICATION (Digital Electronics)
W.E.F : 2009- 10
Term – II

Elective - II

ADVANCED DIGITAL COMMUNICATION

Teaching scheme:
Lectures: 3 hrs / week
Tutorial: 1 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)
Term Work : 50 Marks

Signal spectra & Random Processes:
Basics of Fourier series & Fourier transform, Probability, Random Variables and processes, Digital PAM & PAM formats, Line coding spectral representation, AT & T and CCITT hierarchies.

Digital CW modulation an overview, BPSK, DPSK, DEPSK, OPSK, M'ary PSK, QASK constellation pattern, BFSK, GMSK, Doubinary encoding, QPR coherent & non coherent systems, Bandwidth & spectrum representation, error probabilities in BPSK, DPSK, QPSK, FSK, 16 QAM, MSK, their performance evaluation in presence of AWGN.

Matched correlation, optimum filters, Integrate & Dump, their transfer function, error probabilities, error rate etc.

Spread spectrum techniques: DS, FH, CDMA based system, Performance of DS-SS & FH-SS, generation of PN sequence code.

Error Control Coding**:** Introduction to algebra**,** Group rings, Galois field, two arithmetic GF, Linear block codes: Structure matrix description, Syndrome decoding, Hamming codes, Perfect & Quest, perfect odes, Cyclic codes: Polynomial description, division algorithm, matrix description, fire codes, golay codes, cyclic Redundancy check codes, circuit implementation of cyclic codes.

Encoding and Decoding of BCH and RS codes, MDS Codes, Nested codes, Convolutional Encoders, Tree & Trellis diagram, Veterbi decoding algorithms, Sequential decoding algorithms.

Note : Term Work is based on above syllabus.

References :

1. J. G. Prokais, "Digital Communications", McGraw Hill Inc.

2. Bernad Sklar, “Digital Communication: Fundamentals & Applications”, Pearson Education Asia (LPE).
3. A. B. Carlson, “Communication System”, Mc Graw Hill Inc.
4. Amitabh Bhattacharya, “Digital Communication”, TMH.
5. T. S. Rappaport, “Wireless Communication”, Pearson Education.
6. Simon Haykin, “Digital Communications”, John Wiley & Sons
7. Taub &Schilling, “Principle of Communication System”, TMH.

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M.E. ELECTRONICS AND TELECOMMUNICATION (Digital Electronics)
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Term – I I

Elective - II

ARTIFICIAL INTELLIGENCE

Teaching scheme:	Examination scheme:
Lectures: 3 hrs / week	Theory Paper : 100 Marks (3 Hours)
Tutorial: 1 hrs / week	Term Work : 50 Marks

Fuzzy Logic Introduction to Fuzzy sets, Fuzzy set Theory, Fuzzy relation, Membership functions, fuzzification, defuzzification, fuzzy rule based system fuzzy inference system.

Fuzzy Decision Making, Fuzzy modeling, Fuzzy reasoning, compositional rules of inference, Fuzzy systems as function estimators, Fuzziness as multivalence, Adaptive neuro fuzzy inference system, cognitive neurofuzzy modelling, Neuro fuzzy control, Application of neuro fuzzy control

Neural Network Fundamental of Artificial Neural Network : Artificial Neuron model. Learning process, Single layer and multilayer feed forward network, training by back propagation, Hop-field model basic concept of
Bidirectional associative memory, self organization map, optimization model.
Recurrent Networks, Hamming Net and MAXNET, Feature mapping, counter propagation networks, cluster discovery Network (ART),
Applications of Neural Network Characters Recognition Network, Neural Network control Application, Network for Robot kinematics, Hand written Numeral recognition.

Note : Term Work is based on above syllabus.

References:

1 Limin Fu , “Neural Networks in Computer Intelligence”, McGraw Hill Inc., 1994.
2 N. K. Bose, P. Lling , “Neural Network Fundamentals”, McGraw Hill.
3 Zurada “Artificial Neural Networks”,
4 Timothy J. Ross , “ Fuzzy Logic with Engg. Applications”, McGraw Hill.
5 Jang, Sun, Mezutani “Neuro Fuzzy and Soft computing”, TMH

6 Bart Kasko, “Fuzzy Engineering”, PHI
7 S. Hykin , “Neural Networks”, Pearson Education.
8 J.A.Freeman and B.M.Skapure, “Neural Networks, Algorithms Applications and programming Techniques”, Addison – Wesely, 1990
9 Laurence Fausett, “Fundamental of Nerual Networks: Architecture, algorithms and application”,Prentice Hall, 1994.

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Term – II

Elective - II

Modeling and Simulation Techniques

Teaching scheme:
Lectures: 3 hrs / week
Tutorial: 1 hrs / week

Examination scheme:
Theory Paper : 100 Marks (3 Hours)
Term Work : 50 Marks

Introduction Models and their applications, Common types of mathematical models used for engineering systems, Derivation of models from physical relations, Model determination from input- output observation, Basic principle of simulation, Analog and digital simulation techniques, Models: Structural, Process, Continuous, Discrete, Deterministic,Random, input/output, static, dynamic, multilevel.

Classical and Semi-classical models:
Boltzmann transport equation, classical semiconductor equations- drift diffusion approximation, generation and recombinations, different generation and recombination mechanisms, limitations of drift-diffusions, energy transport, semiclassical and hot electron models, hydrodynamic and semi-classical semiconductor equations, modeling of semiconductor laser diode, general aspects, static models and dynamic models, model verification and validation.

Numerical Techniques: Finite difference methods, first order and second order derivatives and discrimination, finite element method, solution of poison's equation, solution of steady state continuity equation for electrons and holes, advantages and disadvantages of finite element method, Monte Carlo simulation techniques, basic concepts, Random variables, random number generation and testing, analysis of simulation results, confidence intervals, variance reduction techniques. Case studies of analytical and simulation studies

Modeling of Semiconductor Devices p-n junction, p-n junction C-V characteristics, breakdown, Schottky diodes, Hetero-structure diodes, Simulation of above device characteristics in graphical format, Simulation of simple laser diode and plot its characteristics by considering appropriate materials and parameters, PIN diode, Avalanche Photodiode, Quantum transport modeling, 1D models, discretized Schrodinger equation, Transmission matrix formation, I-V characteristics.

Universal FET modeling
sub threshold regime, unified charge control model, short channel effects, I-V modeling.Capacitance modeling (Ward Dutton and Meyer models) Universal models for MOSFET,MESFET, HFET and TFT.

Note : Term Work is based on above syllabus.

References:
1. Modeling of CMOS G.Gordon, 'System Simulation', 2nd ed., Prentice Hall
2. Narsing Deo, 'System Simulation with Digital Computers', Prentice Hall
3. R. Leigh, 'Modelling and Simulation', Peter Peregrims Ltd.,. 1983.
4. M.Law, W.D.Kelton, 'Simulation Modelling and Analysis, Mcgraw Hill, 1982.
5. Raj Jain, The Art of Computer Systems Performance Analysis, John Wiley and Sons, New York, USA, 1991
6. Trivedi, K.S, Probability and Statistics with Reliability, Queueing and computer science Applications, Prentice Hall of India, Reprinted in 1990.