M.Sc.(Applied Electronics) Prospectus No. 091756
I & II Year

संत गाडगे बाबा अमरावती विद्यापीठ
SANT GADGE BABA AMRAVATI UNIVERSITY

(FACULTY OF ENGINEERING & TECHNOLOGY)

अभ्यासक्रमिका
विज्ञान पारंगत (उपयोजित परमाणू विद्युत) परीक्षा
प्रथम वर्ष व द्वितीय वर्ष २००८-२००९

PROSPECTUS

Prescribed for
Two Year Post Graduate
Degree Course in
Master of Science
(Applied Electronics)
First Year & Second Year
Examinations 2008 -2009

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SANT GADGE BABAAMRAVATI UNIVERSITY AMRAVATI
SPECIAL NOTE FOR INFORMATION OF THE STUDENTS

(1) Notwithstanding anything to the contrary, it is notified for general information and guidance of all concerned that a person, who has passed the qualifying examination and is eligible for admission only to the corresponding next higher examination as an ex-student or an external candidate, shall be examined in accordance with the syllabus of such next higher examination in force at the time of such examination in such subjects papers or combination of papers in which students from University Departments or Colleges are to be examined by the University.

(2) Be it known to all the students desirous to take examination/s for which this prospectus has been prescribed should, if found necessary for any other information regarding examinations etc., refer the University Ordinances Booklet the various conditions/ provisions pertaining to examination as prescribed in the following Ordinances.

Ordinance No. 1	:	Enrolment of Students.
Ordinance No. 2	:	Admission of Students
Ordinance No. 4	:	National cadet corps
Ordinance No. 6	:	Examinations in General (relevent extracts)
Ordinance No. 18/2001	:	An Ordinance to provide grace marks for passing in a Head of passing and Inprovement of Division (Higher Class) and getting Distinction in the subject and condonation of defficiency of marks in a subject in all the faculties prescribed by the Statute NO.18, Ordinance 2001.
Ordinance No. 9	:	Conduct of Examinations (relevent extracts)
Ordinance No. 10	:	Providing for Exemptions and Compartments
Ordinance No. 19	:	Admission of Candidates to Degrees.
Ordinance No. 109	:	Recording of a change of name of a University student in the records of the University.
Ordinance No. 138	:	For improvement of Division/Grade.
Ordinance No.19/2001	:	An Ordinance for Central Assessment Programme, Scheme of Evaluation and Moderation of answerbooks and preparation of results of the examinations, conducted by the University, Ordinance 2001.

Dr.K.G.Khamare
Registrar
Sant Gadge Baba Amravati University

PATTERN OF QUESTION PAPER ON THE UNIT SYSTEM

The pattern of question paper as per unit system will be broadly based on the following pattern.

(1) Syllabus has been divided into units equal to the number of question to be answered in the paper. On each unit there will be a question either a long answer type or a short answer type.

(2) Number of question will be in accordance with the unit prescribed in the syllabi for each paper i.e. there will be one question on each unit.

(3) For every question long answer type or short answer type there will be an alternative choice from the same unit. However, there will be no internal choice in a question.

(4) Division of marks between long answer and short answer type question will be in the ratio of 40 and 60.

(5) Each short answer type question shall Contain 4 to 8 short sub question with no internal choice.

SYLLABUS
PRESCRIBED FOR
TWO YEAR POST GRADUATE
DEGREE COURSE
MASTER OF SCIENCE
(APPLIED ELCTRONICS)

SEMESTER : FIRST

1AE1 ELECTRICAL ENGINEERING AND NETWORK ANALYSIS

Unit I : Basic Circuit Elements

Basic concept of voltage, current, power and energy, relationship between them, Sign conventions, V-I relations for R, L, C elements, Ideal sources, equivalent of elements in series and parallel, voltage and current division, Kirchoff's laws applied to dc and ac circuits, Star to delta and delta to star transformations.

Unit II : Circuit Analysis

Standard input signals, source transformations, mesh and node analysis, steady state sinusoidal analysis using Phasors, network equations for RLC network, magnetic coupling, Single phase transformer, principle of operation, EMF equation, losses, efficiency, regulation, condition for maximum efficiency,

Unit III : Graph Theory And Network Equations

Graph of a network, Trees, co trees and loops, Incidence matrix, Cut-set matrix, Tie set matrix and loop currents, possible trees, analysis of a network, network equilibrium equation, Duality.

Unit IV : Laplace Transformation And Its Applications

Laplace transformations, basic theorems, Laplace transform of some important functions, initial and final value theorem, gate function, impulse function, Laplace Transform of periodic functions, time-domain analysis of simple RLC circuits, Solutions of linear differential equations with constant coefficients, Heaviside's partial fraction expansion, Transformed impedance and admittance, solution of network equations using Laplace transform: frequency domain analysis of RLC circuits

Unit V : Network Theorems

Superposition theorem, Reciprocity theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem applied to DC and AC circuits.

Unit VI : Two-Port Network

Open circuit impedance parameters, short circuit admittance parameters, Transmission parameters, Hybrid parameters, Interrelationships between the parameters, Interconnection of two port networks, Input impedance in terms of two port parameters, Output impedance in terms of two port parameters, Driving point and transfer functions,

Text Books:

D.Roy Choudhary : Network and Systems (New Age International)

V.N. Mittle : Basic Electrical Engineering, TMGH

Leonard S. Bobrow : Fundamentals of Electrical Engineering, 2e, Oxford University Press

Reference Books:

Van Valkenburg : Network analysis 3rd Ed. (PHI)

Edminister : Electric Circuits, Schaum Outline Series

DeCarlo, Lin : Linear Circuit Analysis, 2e, Oxford University Press

1AE2 ELECTRONIC DEVICES AND CIRCUITS-I

Unit I : Energy bands in silicon, Intrinsic and Extrinsic silicon, carrier transport in silicon, diffusion current, drift current, mobility, resistivity, Generation and recombination of carrier, P-N Junction diode theory, Large and small signal equivalent circuits and diode, Rectifiers - Half wave, full wave and bridge, Filters-C, LC and their analysis, Zener diode and its application.

Unit II : Theory and Analysis of Bipolar Junction transistor, Configurations, 'h' Parameter, high frequency equivalence circuits, Methods of biasing, their needs, 'Q' and stability factor.

Unit III : Study of typical transistor amplifier circuits:

Emitter follower, Darlington emitter follower, Bootstrap emitter follower, RC coupled amplifier, Transformer coupled amplifier, Cascaded amplifier, Direct coupled amplifier, Cascade stage, Feedback amplifiers.

Unit IV : Class 'A', 'B', 'AB' and 'C' amplifiers, Configuration of audio amplifiers, Calculations of power gain, efficiency, power dissipation and distortion, Oscillators, their criteria, Hartley, Colpitts and R-C Oscillators, Crystal Oscillator.

Unit V : Theory, Construction and applications of Schottky diode, Tunnel diode, Varactor diode, Selenium diode, LED, Photo diode, PIN diode, Phototransistor.

Unit VI : FETs (JFET & MOSFET):

Types, Characteristics and parameters (μ , gm, Rds), Biasing of FET Amplifiers, MOS capacitor, Equivalent circuits of JFET and MOSFETs, UJT: Characteristics, working, UJT as relaxation oscillator.

Text Books:

1. Electronic Devices and Circuits : Millman and Halkias, TMGH
2. Integrated Electronics: : Millman & Halkias (TMGH)
3. Microelectronics : Millman and Grabel (TMGH)

Reference Books:

1. Sedra/Smith : Microelectronics Circuits, 5e, Oxford University Press
2. Electronic Devices & Circuit Theory: - R.L.Boylestad & L.Nashelsky (6^{th} Edition,) Pearson Education.

1AE3 OBJECT ORIENTED PROGRAMMING (C++)

Unit I : Introduction to object oriented programming, Comparison with structured programming, object oriented terminology, data abstraction, Inheritance, Polymorphism.

Unit II : New keywords, type compatibility, scope operator, functions in C++, Function Prototypes, In-line functions, Default arguments, over loading, function over loading, operator overloading, unary operators, binary operators.

Unit III : Classes: Class definition, objects, data members and instance variables, methods, implicit object, class scope, Access specifier, Operator methods, constructors, copy constructors, destructors, Assignment operator, Conversions, Temporary objects and Hidden method calls, static members, dynamic objects, Arrays of objects, friend functions, pointers to members.

Unit IV : Inheritance and polymorphism: Simple inheritance, Constructors and destructors in inheritance, protected access specifier, class conversions, multiple inheritance, multiple base classes, virtual base classes.

Unit V : Polymorphism, Virtual functions, abstract base classes, using polymorphism with examples, Generic functions, Generic classes.

Unit VI : Streams in C++: Inserter, Extractor, formatting, manipulator, error handling, user defined streams, defining Insertion & extraction operators.

Text Books:-

1. A.Kampthane : Object oriented Programming in C++ (Pearson ed)
2. Balguruswamy : Programming in C++, (TMH)

Reference Books:-

1. Herbert Schiltz : C++ the complete reference, (TMH, Osborne)
2. Schaum series : Programming with C++, (MGH)
3. Grady Booch : Object oriented analysis and design, (Addison Wesley)

1AE4 ELECTRIC AND MAGNETIC FIELD

Unit I : Electrostatics: Introduction to cylindrical and spherical coordinate systems. Electric field intensity, Electric flux density, Gauss's law, divergence theorem, Electric potential, Electrostatic Energy and potential gradient.

Unit II : Magnetostatics: Current density and continuity equation, Biot – Savart's law, Stokes theorem, Ampere's circuital law and applications, Magnetic Flux density, Scalar and Vector magnetic potentials, Energy stored in a magnetic field, Maxwell's equations for steady fields.

Unit III : Maxwell's Equations and Boundary Conditions: Maxwell's equation for time varying fields. Electric boundary conditions for conductor-dielectric interface, magnetic boundary conditions for two different magnetic materials.

Unit IV : Electromagnetic Waves: Electromagnetic wave equation in homogeneous medium, wave propagation in a perfect dielectric (free space), Solution of Electromagnetic wave equation, Intrinsic impedance, Poynting vector and Poynting theorem, Reflection and refraction of plane wave.

Unit V : Wave-guides: Field analysis of transmission lines, Rectangular wave-guide, TE, TM, TEM waves in rectangular wave guide, cutoff frequency, cut off wavelength, group and phase velocity, TE and TM waves in circular wave-guide, wave impedance.

Unit VI : Radiation: Retarded potential, Electric and magnetic fields due to oscillating dipole (Alternating current element), power radiated and radiation resistance, Linear arrays, End fire and broad side arrays, Pattern multiplication.

Text Books:

1. Hayt W.H.:"Engineering Electromagnetic", Tata Mc-Graw Hill

2. Jordan and Balmain: "Electromagnetic Wave and radiating Systems", PHI,
3. Matthew N. O. Sadiku: Elements of Electromagnetics, 3e, Oxford University Press

1AE5 COMMUNICATION ENGINEERING-I

Unit I : Signals

Communication systems, information, transmitter, channel noise, receiver, modulation, need for modulation, Audio signals, frequency range for speech and music, sound intensity, loudness, loudness level, frequency response, band width, bandwidth requirement for different types of signals such as telegraph, telephone, speech, music, video.

Unit II : Noise

Atmospheric noise, Extraterrestrial, Industrial, Thermal agitation, shot, Transit-time, miscellaneous noise, addition of noise due to several sources and several amplifiers in cascade, noise in reactive circuits, definition of noise figure, calculation of noise figure, noise figure from equivalent noise resistance, noise figure from measurement, noise temperature.

Unit III : Wave Propagation

Electromagnetic waves, sky waves, ground waves, space waves, ionosphere, critical frequency, maximum usable frequency, virtual height, fading, low frequency and very low frequency propagation, duct propagation and skip distance.

Unit IV : Antenna

Antenna equivalent circuits, coordinate systems, radiation fields, polarization, isotropic radiator, power gain, effective area, and effective length of an antenna, Half wave dipole antenna, Vertical antennas, non resonant antenna, driven arrays, parasitic arrays, parasitic director, folded dipole, Yagi-Uda antenna, microwave antenna, VHF and UHF antennas,

Unit V : Basic Principles of Satellite Communication

Introduction, Kepler's first, second and third law, Orbits, Geo-stationary orbits, power systems, altitude control, satellite station keeping, antenna look angles, limits of visibility, frequency plans and polarization, transponders, uplink, downlink and overall power budget calculations, digital carrier transmission, multiple access methods

Unit VI : Radar Systems

Fundamentals, radar performance factors, basic pulsed radar systems, antennas and scanning, display methods, moving

target indication, CW Doppler radar, frequency modulated CW Radar.

Text Book:

Kennedy G. : Electronic communication system (Mc-Graw Hill) 4th Ed

Reference Book:

Dennis Roddy & John Coolen: Electronic communication (PHI)) 4th Ed

1AE6 Practicals

Minimum (8) Practicals based on 1AE1 and 1AE5

1AE7 Practicals

Minimum (8) Practicals based on 1AE2

1AE8 Practicals

Minimum (8) Practicals based on 1AE3

SEMESTER : SECOND

2AE1 LINEAR INTEGRATED CIRCUITS

Unit I : Operational Amplifier:

IC fabrication process, Oxidation, diffusion, ion implantation, photolithography, n-tub, p-tub, twin-tub, CMOS process, Differential amplifier: gain expression using H parameters, transfer-characteristics, constant current source, level shifting, block diagram of op-amp, frequency response, frequency compensation methods, study of IC , measurement of parameters of op-amp, off set nulling and their importance.

Unit II : Linear Applications of Op-amp

Inverting and non inverting amplifiers, voltage followers (AC-DC), integrator, differentiator, Differential amplifier, bridge amplifier, Instrumentation amplifiers, precision rectifier, RMS to DC converter, voltage to current converter, sinusoidal RC oscillators, constant voltage sources, frequency to voltage and voltage to frequency converter.

Unit III : Non-Linear Applications of Op-Amp and Filter Circuits

Clipping and clamping circuits, comparator, astable, monostable and bistable multivibrator, Schmitt Trigger, voltage sweep generator, active filters: Butterworth, Chebyshev filters using op-amp,

Unit IV : Voltage Regulator

Transistorized series and shunt voltage regulators, Block schematic of regulator IC 723, regulated power supply using IC 723, short circuit protection, switch mode power supply,

dual tracking regulators, regulator using 78xx, 79xx, and LM 317.

Unit V : Timers:

Block schematic of regulator IC 555, application of timer 555 as astable, monostable and bistable multivibrator, Delayed timer, sawtooth generators, function generator using 8038, Sample & Hold circuit

Unit VI : Phase Locked Loops

Operation of phase lock loop system, transfer characteristics, lock range and capture range, study of PLL IC-LM 565 and its application as AM detector, FM detector and Frequency translator.

Text Books:

1. Gayakwad R.A. : Op-Amps and Linear Integrated Circuits, Prentice Hall of India Pvt. Ltd., New Delhi (2nd edition)
2. Robert F. Coughlin and F.F.Driscoll : Operational Amplifiers & Linear Integrated Circuits, Pearson Education

Reference Book:

Sedra/Smith : Microelectronics Circuits, 5e, Oxford University Press

2AE2 MICROWAVE ENGINEERING

Unit I : Microwave tubes

Electromagnetic Frequency spectrum, noise in microwave tubes, two cavity Klystron, Reflex Klystron, traveling wave tube, magnetron (cylindrical type).

Unit II : Microwave solid-state devices

Tunnel diode, negative resistance amplifier, Gunn diode, Varactor diode, parametric amplifier, PIN diode, TRAPATT, IMPATT, Introduction to MASERs

Unit III : Transmission of microwaves

Microwave transmission line (field analysis), Characteristic impedance, Smith chart, Rectangular wave guide, TE, TM wave propagation, cut-off frequency, cut-off wavelength, group and phase velocity, wave impedance, circular wave guide., types of strip lines, strip lines characteristics.

Unit IV : Microwave passive components

Microwave terminations, attenuators, Phase shifter, faradays rotation, Devices employing Faraday rotation (isolator and circulator), directional Couplers, scattering matrix formulation of N-port junction.

Unit V : Microwave resonator and filter

Basic RLC resonance circuits (series and parallel), Quality factor, rectangular cavity resonator and their Q, TE_{mnp} , TM_{mnp} mode propagations, Re-entrant cavity, circular cavity resonator, transmission line resonator.

Unit VI : Microwave communication systems

Microwave link carrier chain, Tropospheric scatter link using frequency diversity, LOS (Line Of Sight) communication system (Ground base), microwave absorption (Fading), Noise in microwave communication system.

Text Books:

1. Collin, Robert E:" Foundations for Microwave Engg", McGraw Hill, New York
2. Liao, Samuel Y:"Microwave devices & circuits", Tata McGraw Hill Co Ltd, New Delhi.
3. M. Kulkarni: "Microwave and Radar Engg", Umesh Publication:

Reference book:

Kennedy G. Electronic communication systems, TMH, 4TH Ed.

2AE3 COMMUNICATION ENGINEERING-II

Unit I : AM TRANSMITTERS

AM modulation, Frequency Spectrum, Principles of DSB-FC, DSB-SC, SSB-SC, modulation and their Comparison, Details of DSB-FC Transmitter, Generation of DSB-SC by using Balanced modulators (FET & Diodes), DSB-SC Transmitter.

Generation of SSB-SC by phase shift method.

Unit II : AM RECEIVERS

TRF Receivers, Super heterodyne receiver, RF Amplifier, Oscillator, Mixer, IF Amplifier, Diode detector.

Need and Types of AGC, Characteristics such as selectivity, sensitivity, fidelity, Communication Receiver.

Unit III : FM TRANSMITTER

FM Modulation, Frequency Spectrum, Circuits and Analysis for direct FM Generation using FET and varactor diode. Circuit & Analysis of indirect FM generation, Narrow Band and Wide Band FM, their comparison, De-emphasis and pre–emphasis.

Unit IV : FM RECEIVERS

FM receiver, R.F. amplifier, AGC, Limiter, FM Discriminator, Single Slope and Balanced slope detector, Analysis of Foster Seeley and ratio detectors, stereo FM receiver.

Unit V : PULSE MODULATION

The sampling theorem, Quantization and types of Quantization, Practical aspects of sampling, Reconstruction of message signal from its Samples, Time Division Multiplexing, Pulse Amplitude Modulation, Pulse Time Modulation, PCM, DM.

Unit VI : PROBABILITY & INFORMATION THEORY

Definitions, Probability of random events, Laws of probability, joint & conditional probability, relationships involving joint, marginal & conditional probabilities, Baye's rule, statistical independence, Binary communication channel, discrete communication channel, information content, rate of information, joint entropy & conditional entropy.

Text Books:

1) Kennedy G. Electronics communication systems, TMH, 4TH Ed.
2) Lathi B.P. Modern digital & analog Communication Systems, 3rd Ed. Oxford University press.

Reference Book:

Roddy & Coolen Electronics communication systems, PHI, 4TH Ed.

2AE4 DIGITAL INTEGRATED CIRCUITS

Unit I : Switching Characteristics of Semiconductor devices:

Temperature dependence, Transistor characteristics in switching mode, switching speeds of devices, Schottky diode and transistor Analysis of MOSFET and MOSFET as a switch, characteristics of CMOS, CMOS gates.

Unit II : Combinational Logic Design:

Function of binary variables, Boolean Algebraic theorems, standard form of logical function, K-map up to five variables, Quine Mc-Clusky method, Don't care conditions and their effects, Synthesis using AND- OR gates

Unit III : Combinational Logic Design using 74/54 series MSI chip series concerning to multiplexers, De-multiplexers, decoders, encoders, comparators, code converters, priority encoders parity generator/ checker & BCD-to-seven segment decoder.

Unit IV : Combinational Logic Design using ROM array, PLA, PAL, Preliminary design concepts using FPGAs, N-bit binary adder using 7480. carry Look ahead adder construction.

Unit V : Design of counter and sequential networks: Analysis of clocked sequential networks, General models of sequential machines, Equivalence and minimization networks, Deviation or state graph and tables, reduction of state assignments, S.M. chart.

Unit VI : Analysis of asynchronous sequential networks, derivation and reduction of primitive flow tables, state assignments and realization of flow tables, hazards, asynchronous sequential network design.

Text Books:

1. M. Mano. : Digital Design 3rd ed (Pearson Education)
2. R.P.Jain Modern Digital Electronics 3rd ed (TMH)

2AE5 ELECTRONIC DEVICES AND CIRCUITS- II

Unit I : Linear wave shaping using RC and RL circuits, analysis and calculation of RC low pass and high pass filters, analysis of clipping and clamping circuits using diodes and switching transistors, basic concepts of digital storage oscilloscope (block diagram)

Unit II : Switching characteristics of semiconductor devices: Diode as switch, transistor as a switch, characteristics and analysis FET as a switch, characteristics of JFET, CMOS, Collector coupled bistable, monostable and astable multivibrators, Time base generators and sweep generators.

Unit III : Number systems, Gray codes, Arithmetic operations, 2's complements, floating point arithmetic and its representation, Logic gates, Boolean algebra, Study and analysis of digital logic families: RTL, DTL, TTL, ECL, MOS, CMOS and their characteristics, Tri-state logic, 54XX/74XX TTL series.

Unit IV : Latches, Flip-Flops R-S, J-K, Master slave J-K, D-type, T-type, registers and counters, Adders and subtractors using logic gates.

Unit V : Types of semiconductor memories, sequential memories, 2 and 4 phase ratio-less shift registers, CMOS registers stages, static shift registers, implementation of ROM (ROM, PROM, EPROM, EEPROM) BJT RAM cell, MOS-RAM, CCD memories.

Unit VI : Sampling gates using diodes, Sample and Hold circuits, ADC techniques: Parallel-comparator, Successive approximation, Dual slope and DAC techniques: Weighted- Resistor, R-2R ladder, Characteristics of D/A converter.

Text Books:

1. Millman and Taub : Pulse, Digital and Switching wave forms (TMGH)
2. Millman and Grabel : Microelectronics (TMGH)

Reference Books:

1. Sedra/Smith : Microelectronics Circuits, 5e, Oxford University Press
2. R.P.Jain : Modern Digital Electronics (TMGH)

2AE6 Practicals

Minimum (8) Practicals based on 2AE1

2AE7 Practicals

Minimum (8) Practicals based on 2AE2 and 2AE3

2AE8 Practicals

Minimum (8) Practicals based on 2AE4 and 2AE5

SEMESTER : THIRD

3AE1 ELECTIVE-I

(1) Wavelet Transforms & Applications

Unit I : Continuous wavelet transform: Introduction, continuous-time wavelets Definition of the CWT, The CWT as a correlation, constant Q factor filtering interpretation and time- frequency resolution, The CWT as an operator, inverse CWT.

Unit II : Introduction to the discrete wavelet transforms and orthogonal wavelet decomposition, Introduction, approximations of vectors in nested linear vector subspaces, example of multi resolution analysis.

Unit III : Formal definition of an MRA, construction of a general orthogonal MRA, A wavelet basis for the MRA, Digital filtering interpretation: decomposition filters, reconstructing the signal Daubechies D4 scaling function and wavelet, band-limited wavelets, interpreting orthonormal MRAs for discrete-time signals.

Unit IV Alternative wavelet representations: Introduction, bi-orthogonal wavelet bases, filtering relationship for bi-orthogonal filters, examples of bi-orthogonal scaling functions and wavelets, Two- dimensional wavelets, non separable multidimensional wavelets, wavelets packets.

Unit V Wavelet transform and data compression, introduction, transform coding, DTWT for image compression,a u d i o compression, video coding using multi resolutions Techniques: a brief Introduction.

Unit VI Other application of wavelet transforms: Introduction, wavelet denoising, speckle removal, edge detection and object isolation, i image fusion, object detection by wavelet transforms of projections, communication applications: scaling functions as signaling pulses, discrete wavelet multi-tone modulation.

Text book :

Wavelet transforms: Introduction Theory and Applications: R.M. Rao & A.S.Bopurdikar, Pearson Education .

3AE1 ELECTIVE-I

(2) FUZZY LOGIC AND APPLICATIONS

Unit I : Background, uncertainty and imprecision, statistics and random processes, uncertainty in information, fuzzy sets and memberships, chance versus ambiguity, classical sets: operations on classical sets, properties of classical (crisp) sets, mapping of classical sets to functions, fuzzy sets: fuzzy set operations, properties of fuzzy sets, sets as points in hypercube.

Unit II : Fuzzy relations: Cardinality, operations, properties, fuzzy Cartesian product and composition, noninteractive fuzzy sets, fuzzy tolerance and equivalence relations, value assignment: cosine amplitude, max-min method, other similarity methods.

Unit III : Features of the membership function, standard forms and boundaries, Fuzzification, membership value assignments: intuition, inference, rank ordering, angular fuzzy sets, inductive reasoning, lambda -cuts for fuzzy sets, lambda-cuts for fuzzy relations, defuzzification methods.

Unit IV : Extension principle: functions of fuzzy sets-extension principle, fuzzy transform (mapping), practical considerations, Fuzzy numbers, interval analysis in arithmetic, approximate methods of extension: vertex method, DSW algorithm, comparisons, Fuzzy vectors, Fuzzy logic, approximate reasoning, fuzzy tautology, contradictions, equivalence, logical proofs.

Unit V : Applications Part I: Fuzzy rule-based systems: natural language-linguistic hedges, rule-based systems: canonical rule forms, decomposition of compound rules, likelihood and truth qualification, aggregation of fuzzy rules, Nonlinear simulation using Fuzzy-rule based system, Fuzzy associative memories (FAM).

Unit VI : Application part II: Fuzzy classification: Classification by equivalence relations: Crisp relations, fuzzy relations; cluster analysis, cluster validity, c-means clustering, Hard c-means (HCM), Fuzzy c-means (FCM); Classification metric, hardening the fuzzy c-partition, similarity relations from clustering, feature analysis, partitions of the feature space, single-sample identification.

Text Book : Fuzzy logic with engineering applications: Timothy J.Ross, MGH

Reference book:

Fuzzy sets and fuzzy logic-Theory and applications: George J. Klir & Bo Yuan, PHI/Pearson.

3AE2 CONTROL SYSTEMS

Unit I : Basic definitions, Closed and open loop systems, transfer functions, block diagrams, Derivation of transfer functions (only electrical systems), signal flow graphs, basic control action.

Unit II : Time response Analysis, Impulse response function, Analysis of first, second and higher order system, stability of control system, Routh Hurwitz's stability criterion, static and dynamic errors coefficients, error criteria

Unit III : Root locus method, introduction, root locus plots, rules for constructing root loci, Root locus analysis of control systems, effect of zeros, derivative control and velocity feed back.

Unit IV : Frequency response, Bode Plots, Determination of static Position, Velocity and acceleration error coefficients. Polar plots, Nyquist stability criterion, stability analysis, relative stability.

Unit V : State space representation of systems, solutions of state equations, transition matrix, diagonalisation, controllability and observability.

Unit VI : Sampled data control system; Introduction, difference equations, Z-transform and properties, Inverse Z-transforms. Analysis of sampler and Zero-order hold, transfer function of sampled data systems (Block diagrams)

TEXT BOOKS:

1) I.J. Nagrath & M. Gopal (3/e) : Control systems Engineering (WEL)
2) Stefani, Shahian, Savant, Hostetter: Design of Feedback Control Systems, 4e, Oxford University Press
3) B.C. Kuo (7/e): Automatic Control Systems (PHI)
4) Ogata : Modern Control Engineering (PHI)

3AE3 OPTICAL FIBER COMMUNICATIONS

Unit I : Optical fiber wave-guide:
Total internal reflection, Snell's law, Theory of circular wave guide, Modes in optical fibers, Single mode fiber, Multimode fiber, N.A., Power flow

Unit II : Transmission Characteristics of Fiber:
Attenuation, Absorption losses, scattering losses, bending losses, dispersion, and intra modal - inter modal dispersion,

bandwidth, and nonlinear effects in single-mode fiber.

Unit III : Optical Sources:
Optical emission from semiconductors, LED, efficiency, double hetero junction LED, Basic concept of Lasers, Semiconductor injection lasers.

Unit IV : Optical Fibers:
Manufacturing, fiber splicing and connectors, different manufacturing techniques, different splicing techniques and connectors.

Unit V : Detectors:
Optical detection principle, absorption, quantum efficiency, responsivity, PIN photo diode, APD and noise in photodiode.

Unit VI : Optical Electronic System:
Optical transmitter, receiver, digital system planning consideration, power budgeting coherent and noncoherent systems, modulation demodulation scheme, wavelength division multiplexing.

Text Books:

1. Senior J.M.: "Optical Fiber Communication and Application", Prentice Hall of India Pvt.Ltd. New Delhi
2. G.Keiser: "Optical Fiber Communication", Mc-Graw Hill International Book Common. New York
3. R. P. Khare: Fiber Optics and Optoelectronics, Oxford University Press

Reference Books:

1. Gower: "Optical Communication System", Prentice Hall
2. D.K.Mynbaev, L.I.Scheiner: "Fiber Optic Communication Technology", LPE, Pearson Education

3AE4 MICROPROCESSOR AND INTERFACING

Unit I : Evolution of Microprocessors, organization of Microcomputer with microprocessor chip, Address decoding techniques, 8085 architecture: 8085 CPU pins and associated signals, register structure, memory addressing and addressing modes.

Unit II : Instruction set of 8085 microprocessor, Timing diagrams, Assembly language programming, using data transfer, arithmetic and logic branch instruction, time delays, Stack subroutine.

Unit III : Programmed I/O, Memory mapped I/O, Standard I/O, Unconditional and Conditional programmed I/O, Interrupt driven I/O, Principles of DMA.

Unit IV : 8155 I/O ports and its interfacing with 8085, interrupt System of 8085, examples of interrupt driven data transfer, Software controlled serial data transfer with examples.

Unit V : Interfacing devices: Architecture, mode, programming of PPI 8255, DMA Controller 8237, USART 8251, Interfacing standards- RS 232C and IEEE 488.

Unit VI : 8 and 12 bit ADCs (0800/0808,1210/1211): Working and interfacing with 8085 & programming. DAC (0800/0808/1008): Working, interfacing with 8085. Realization of ADC using DAC.

Text Books :

1) M.Raffiquzzaman : Microprocessors theory & application, (PHI), 2e
2) R.S.Gaonkar : Microprocessor architecture, programming and application with 8085/8080 (WEL)
3) J.Uffenbeck : Microcomputers & Microprocessors, (PHI)/Pearson, 2e

Reference Book:

INTEL : Microprocessor & Peripherals Hand Book

3AE5 DIGITAL SIGNAL PROCESSING

Unit I : Introduction to DSP, Frequency domain description of signals & systems, Discrete time sequences systems, Linearity, unit sample response, Convolution, Time invariant system, Stability criteria for discrete time systems, Solution of linear difference equations.

Unit II : Introduction to Fourier transform of Discrete Time Signal and its properties, Inverse Fourier transform, Sampling of continuous time signal, Reconstruction of continuous time signal from sequences, Z-Transform and its properties, complex Z-plane, ROC, Determination of filter coefficients, relationship between Fourier transform and Z-Transform, Inverse Z-Transform.

Unit III : DFT and its properties, Circular convolution, linear convolution from DFT, FFT, Decimation in time and frequency algorithm, Introduction to wavelet transform.

Unit IV : Filter categories, Direct form I, Direct form II, Cascade and parallel structure for IIR and FIR Filter, Frequency sampling structures for F.I.R. filter, Steps in Filter Design, Design by pole zero placements, FIR filter design by Windowing method, Rectangular, Triangular and Blackman window

Unit V : Analog filter types: Butterworth, Elliptic and Chebyshef filter, Filter Specifications, formulae, filter order, Methods to convert analog filter into digital filters, Mapping of differential, impulse invariant, Bilinear, Matched Z transformation.

Unit VI : Multi rate DSP, Introductory concept of multi rate signal processing, Design of practical sampler, Rate converters, Decimators and Interpolator, Filter bank application and examples

Text books:

1. Proakis and Manolakis : Digital Signal Processing, 3/e, Pearson Education
2. S. Salivahan, A. Vallavaraj : Digital Signal Processing (TMH)

Reference Book:

B. P. Lathi : Signal Processing and Linear Systems, Oxford University Press

3AE6 Practicals

Minimum (8) Practicals based on 3AE3

3AE7 Practicals

Minimum (8) Practicals based on 3AE4

3AE8 Practicals

Minimum (8) Practicals based on 3AE5

3AE9 Project and Seminar

The project work should be either hardware and/or software based. Every student has to submit a seminar report and deliver a seminar on advance topics.

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SEMESTER : FOURTH

4AE1 ELECTIVE-II
(1) NEURAL NETWORKS

UNIT I : Introduction:

What is a Neural Network? Benefits of Neural Network, Human brain, models of a neuron, Neural Network viewed as directed graphs, feedback, network architectures, knowledge representation, AI and Neural Network, historical overview.

UNIT II : Learning Processes:

Error-correction learning, memory-based learning, Hebbian learning, Competitive learning, Boltzmann Learning, Learning with a teacher, learning without a teacher, learning tasks: pattern association, pattern recognition, function approximation, control, filtering, beamforming, associative memory, adaptation

UNIT III : Perceptrons:
Multilayer perceptrons, backpropagation algorithm, sequential and batch modes of training, XOR problem, heuristics for making the backpropagation algorithm perform better, output representation and decision rule, feature detection, generalization, cross-validation, network pruning techniques, virtues and limitations of backpropagation learning.

UNIT IV : Radial Basis Function Neural Networks:
Cover's theorem on the separability of patterns, interpolation problem, supervised learning as an ill-posed hypersurface reconstruction problem, regularization networks, generalized RBF networks, approximation properties of RBF networks, comparison of RBF networks and multilayer perceptrons, learning strategies

UNIT V : Self-Organizing Maps:
Introduction to principal components analysis, some intuitive principles of self-organization, principal components analysis (PCA), Two basic feature-mapping models, self-organizing map, summary of the SOM algorithm, properties of the feature map, learning vector quantization, adaptive pattern classification, hierarchical vector quantization.

UNIT VI : Dynamically driven Recurrent Neural Networks: network architectures for temporal processing, focused time lagged feedforward networks, distributed time lagged feedforward networks, temporal backpropagation algorithm, Recurrent Network architectures, state-space model, nonlinear ARX model, computational power of recurrent networks, learning algorithms, back-propagation through time, real-time recurrent learning,

Text Books:

1. Neural Networks: A Comprehensive Foundation by Simon Haykin, Pearson Education
2. C. M. Bishop: Neural Networks for Pattern Recognition, Oxford University Press

4AE1 ELECTIVE-II

(2) DIGITAL IMAGE PROCESSING

Unit I : Digital Image representation, fundamental steps in image processing, elements of digital image processing systems, elements of visual perception, a simple image model, sampling and Quantization, some basic relationships between pixels.

Unit II : Introduction to the Fourier transforms, the discrete Fourier transform, properties of the two –dimensional Fourier transform: separability, translation, periodicity and conjugate symmetry, rotation, distributivity and scaling, convolution and correlation.

Unit III : The fast Fourier transform: FFT algorithm, number of operations, the inverse FFT, Implementation, Walsh transform, Hadamard transform, DCT, the Haar transform, The slant transforms, the Hotelling transform.

Unit IV : Image enhancement:
Spatial domain methods, frequency domain methods, enhancement by point processing, spatial filtering, enhancement in the frequency domain.

Unit V : Image Restoration:
Degradation model, diagonalization of circulant and block-circulant matrices, algebraic approach to restoration, inverse filtering, LMS (Wiener) filter, constrained least squares restoration, interactive restoration.

Unit VI : Image compression:
Coding redundancy, inter-pixel redundancy, psycho-visual redundancy, fidelity criteria, image compression models, error-free compression: variable-length coding, bit-plane coding, lossless predictive coding, lossy compression: Losy predictive coding, Transform coding, JPEG standards.

Text book: -

Digital Image processing: Rafael C.Gonzalez & Richards E.Woods

4AE2 VLSI DESIGN

Unit I : Introduction to VHDL, VHDL terms, Traditional design methods, Identifier, data objects, data types, and operators.

Unit II : Behavioral Modeling:
Entity declaration, Architecture body, Process statement, Variable Assignment statement, Signal assignment statement, wait statement, If statement, case statement, null statement, loop, exit, next, assertion, report statement, Other sequential statement, multiple processes, postponed processes.

Unit III : Dataflow modeling:
Concurrent signal assignment statement, Concurrent versus Signal assignment statement, delta delay revisited, multiple drivers, conditional signal assignment statement, selected signal assignment statement, The unaffected value, Block statement, concurrent assertion statement, value of a signal.

Structural Modeling:

Component declaration, component instantiation, resolving signal values, examples.

Unit IV : Generic and Configurations: Generics, configuration specification, configuration declaration, default rules, conversion functions, Direct instantiation, incremental binding, Subprograms and Overloading: Subprograms, Subprograms Overloading, Operator overloading, signatures, Default Values for parameters,Packages and Libraries: Package declaration, Package body, design file, design libraries, order of analysis, implicit visibility, Explicit visibility.

Unit V : Model Simulation

Simulation, writing a test bench, converting real and integer to time, Dumping results into a text file, reading vectors from a text file, a test bench example, initializing a memory, variable file names.

Unit VI : Hardware Modeling Examples

Modeling entity interfaces, modeling simple elements, different styles of modeling, modeling regular structures, modeling delays, modeling conditional operations, modeling synchronous logic, State machine modeling, Interacting state machines, modeling a Moore FSM

Text Books:

1. J. Bhaskar, "VHDL Primer",(PHI) Pearson Education
2. Douglas Perry," VHDL", Tata McGraw Hill

Reference Book:

Yalmanchili, "Introduction to VHDL", (PHI) Pearson Education

4AE3 MICROCONTROLLER AND APPLICATIONS

Unit I : The 8051 Architecture -I

Program Counter data pointer, flags & PSW, Internal memory, Internal RAM Introduction 8051microcontroller hardware, output pins, ports ckts, External memory, Register bank, the stack & stack pointer, SFR Internal ROM Connection to the external memory

Unit II : The 8051 Architecture -II

Counters and timers, timer counter interrupt, timer modes of operation Counting, serial data input &output. Serial data interrupt, data transmission, data reception, Serial data transmission mode and Interrupts

Unit III : Assembly Language Programming-I

Addressing modes, external data transfer, code memory data

moves, Push, Pop and data exchange instructions, logical Bit and Byte level operation. Rotate and swap operation.

Unit IV : Assembly Language Programming-II

Arithmetic operation, jump and call instructions, time delay generations and calculation. Interrupts and return, serial communication programming and Timer counter Programming.

Unit V : Real World interfacing -I

Interfacing of LCD to 8051, interfacing of Seven Segment display to 8051 and programming. Interfacing of analog to digital converter to 8051 and programming. Pulse and time measurement.

Unit VI : Real World interfacing –II

Interfacing of keyboard to 8051, interfacing of Digital to analog converter to 8051. Interfacing of Stepper Motor to 8051. Interfacing of 8255 to 8051 and Programming.

Text Books:

1.	KENNETH J. AYALA:	The 8051 Micro Controller (Penram International)
2	MAZIDI:	The 8051 Micro Controller And Embedded Systems (Pearson Ed)

4AE4 DSP PROCESSOR AND APPLICATIONS

Unit I : Architectural overview of TMS 320C5X (I):

TMS320 Family overview, History, Development and advantages of TMS320 DSP, Key features of TMS320C5X, Bus structure, CPU, Central Arithmetic Logic Unit, Parallel logic unit, Auxiliary register arithmetic unit, registers in TMS3205X and on chip peripherals of TMS320C5X.

Unit II : Architectural overview of TMS 320C5X (II):

Program controller, Program counter hardware stack, program memory address generation, status and control registers, conditional operations, single instructions repeat functions, block repeat functions, interrupts, reset and power down mode.

Unit III : Pipeline and Memory structure of TMS320C5X:

Pipeline structures, pipeline operations, normal pipeline operations, pipeline operation on branch and subroutine call, pipeline operation on ARAU memory mapped registers, pipeline operation on external memory conflict, Memory space overview, programme memory, local data memory, global data memory, input output space, direct memory access, memory management.

Unit IV : Addressing modes in TMS320C5X:

Direct addressing, indirect addressing options, bit reverse addressing, immediate addressing, short and long immediate addressing, dedicated register addressing using contents of BMAR, dedicated register addressing using contents of DBMR, memory map register addressing, circular addressing.

Unit V : Instruction set of TMS320C5X (I):

Accumulator memory reference instructions: ABS, ADCB, ADD, ADDT, AND, BSAR, CRGT, EXAR, LACB, LAMM, NORM, ORB, SAMM, SBB, SFRB, SUB, SUBT, XORB, ZALR, ZAP etc.

Auxiliary register and data memory page pointer instructions: ADRK, CMPR, LAR, LDP, MAR, SAR, SBRK, LT.

Parallel logic unit (PLU) Instructions: APL, CPL, OPL, SPLK, XPL, LPH

Unit VI : Instruction set of TMS320C5X (II):

TREGO, PREG, AND, MULTIPLY INSTRUCTION: LTA, MAC, MACD, MPY, SPL, SQRS, ZPR, MPYU, SPH, LTD, LTP, etc

Branch and Call Instructions: B, BACC, BANZ, CALA, CALL, INTR, NMI, RET, TRAP, XC, etc.

I/O and Data memory, control instructions: IN, OUT, BLDP, LMMR, BIT, LST, PUSH, POP, RPT, RPTZ, SETC, SST, etc.

Text Book:

TMS320C5X User's guide: Texas Instruments Inc.

4AE5 **DIGITAL COMMUNICATION**

Unit I : DIGITAL COMMUNICATION SYSTEM

Elements of digital communication System, source encoder, decoder, Channel encoder, decoder, modulator, demodulator, synchronization and carrier synchronization.

Unit II : DISCRETE COMMUNICATION CHANNEL

Source Encoding, Shannon's Encoding algorithm, Huffman encoding algorithm, discrete communication Channel, capacity of discrete communication channel. Shannon's theorem on channel capacity.

Unit III : DIGITAL MODULATION AND TECHNIQUES

Digital carrier modulation Schemes, ASK, PSK, FSK coherent, bandwidth consideration and probability of errors, comparison of digital modulation system, Basic of DPSK, QPSK, MSK.

Unit IV : ERROR CONTROLLING AND CODING

Introduction to error controlling and coding, Methods of

controlling errors, type of errors and codes, linear block codes, Matrix description of linear block code, error detection and error correction capabilities of linear block code, cyclic code.

Unit V : BASE BAND TRANSMISSION

Base band PAM system, inter symbol interference, Nyquist criterion, matched filter receivers, pulse shaping, equalization, eye diagram synchronization, scrambler and unscramble, Duo binary signaling scheme.

Unit VI : MODERN TECHNIQUES OF COMMUNICATION

Multiple access schemes: TDMA, FDMA, CDMA, spread spectrum communication, D.S. spread spectrum, frequency hopping spread spectrum, comparison.

Introduction to mobile communication: Cellular mobile telephone architecture, frequency assignments, frequency reuse, cell splitting, cell initialization, cell termination, handover.

Text Books:

1) Shanmugam K.S. Digital & analog Communication Systems, John w.& sons
2) William C.Y..Lee Mobile cellular telecomm. Systems, MGH,2ND ED

Reference books:

1) Simon Haykin Digital Communication John w. & sons
2) J.G. Proakis Digital Communication MGH 4TH ED

4AE6 **Practicals**

Minimum (8) Practicals based on 4AE2 & 4AE3

4AE7 **Practicals**

Minimum (8) Practicals based on 4AE4

4AE8 **Project**

Project (including 3AE9). The project work should be either hardware and/or software based. A project report be submitted in two copies, of which one copy will be maintained by the departmental library.

4AE9 **Seminar**

Every student has to submit a seminar report and deliver a seminar on advance topics.

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APPENDIX-A
SCHEME OF THE TWO YEARS (FOUR SEMESTERS)
M. Sc. (APPLIED ELECTRONICS) COURSE **(Revised)**

I-SEMESTER

SUB. CODE	NAME OF SUBJECT	INT. MARK	EXT. MARKS	TOTAL MARKS	MIN. PASSING MARKS IN PAPER/ PRACT.	LECT. (Hrs.)	PRACT. (Hrs.)	TOTAL	DURA-TION OF PAPER IN HOURS
1AE1	Electrical Engineering & Network Analysis	20	80	100	40	05	___	05	3
1AE2	Electronic Devices and Circuits - I	20	80	100	40	05	___	05	3
1AE3	Objected Oriented Programming In C++	20	80	100	40	05	___	05	3
1AE4	EMF	20	80	100	40	05	___	05	3
1AE5	Communication Engg.-I	20	80	100	40	05	___	05	3
1AE6	Practicals on 1 AE1 and 1AE5	25	25	50	25	___	*02	*02	___
1AE7	Practicals on 1AE2	25	25	50	25	___	*02	*02	___
1AE8	Practical on 1AE3	25	25	50	25	___	*02	*02	___
	Total			650		25	*06		

* Indicates a load per practical batch.Actual load for practical shall be calculated by multiplying with number of practical batches.

SCHEME OF THE TWO YEARS (FOUR SEMESTERS)
M. Sc. (APPLIED ELECTRONICS) COURSE **(Revised)**

II-SEMESTER

SUB. CODE	NAME OF SUBJECT	INT. MARK	EXT. MARKS	TOTAL MARKS	MIN. PASSING MARKS IN PAPER/ PRACT	LECT. (Hrs.)	PRACT. (Hrs.)	TOTAL	DURA-TION OF PAPER IN HOURS
2AE1	Linear Integrated Circuits	20	80	100	40	05	___	05	3
2AE2	Microwave Engg.	20	80	100	40	05	___	05	3
2AE3	Communication Engg.-II	20	80	100	40	05	___	05	3
2AE4	Digital Integrated Ckts.	20	80	100	40	05	___	05	3
2AE5	Electronic Devices & ckts-II	20	80	100	40	05	___	05	3
2AE6	Practicals on 2AE1	25	25	50	25	___	*02	*02	___
2AE7	Practicals on 2AE2 & 2AE3	25	25	50	25	___	*02	*02	___
2AE8	Practicals on 2AE4 & 2AE5	25	25	50	25	___	*02	*02	___
	Total			650		25	*06		

* Indicates a load per practical batch.Actual load for practical shall be calculated by multiplying with number of practical batches.

SCHEME OF THE TWO YEARS (FOUR SEMESTERS)
M. Sc. (APPLIED ELECTRONICS) COURSE **(Revised)**

III-SEMESTER

SUB. CODE	NAME OF SUBJECT	INT. MARK	EXT. MARKS	TOTAL MARKS	MIN. PASSING MARKS IN PAPER/ PRACT	LECT. (Hrs.)	PRACT. (Hrs.)	TOTAL	DURA-TION OF PAPER IN HOURS
3AE1	Elective 1#	20	80	100	40	05	___	05	3
3AE2	Control systems	20	80	100	40	05	___	05	3
3AE3	Optical Fiber Communications	20	80	100	40	05	___	05	3
3AE4	Microprocessors & Interfacing	20	80	100	40	05	___	05	3
3AE5	Digital Signal Processing	20	80	100	40	05	___	05	3
3AE6	Practicals on 3AE3	25	25	50	25	___	*02	*02	___
3AE7	Practicals on 3AE4	25	25	50	25	___	*02	*02	___
3AE8	Practicals on 3AE5	25	25	50	25	___	*02	*02	___
3AE9	Project & Seminar	___	___	___	___	___	**4	**4	___
	Total			650		25			

* Elective I 1) Wavelet Transforms & Applications 2) Fuzzy Logic and Applications

* Indicates a load per practical batch.Actual load for practical shall be calculated by multiplying with number of practical batches.
** Indicates a load per project batch.Actual load for project shall be calculated by multiplying with number of project batches.

SCHEME OF THE TWO YEARS (FOUR SEMESTERS)
M. Sc. (APPLIED ELECTRONICS) COURSE **(Revised)**

IV-SEMESTER

SUB. CODE	NAME OF SUBJECT	INT. MARK	EXT. MARKS	TOTAL MARKS	MIN. PASSING MARKS IN PAPER/ PRACT	LECT. (Hrs.)	PRACT. (Hrs.)	TOTAL	DURA-TION OF PAPER IN HOURS
4AE1	Elective II#	20	80	100	40	05	___	05	3
4AE2	VLSI Design	20	80	100	40	05	___	05	3
4AE3	Microcontroller & Applications	20	80	100	40	05	___	05	3
4AE4	DSP Processor and Applications	20	80	100	40	05	___	05	3
4AE5	Digital Communications	25	80	100	40	05	___	05	3
4AE6	Practical on 4AE2 & 4AE3	25	25	50	25	___	*02	*02	___
4AE7	Practical on 4AE4	25	25	50	25	___	*02	*02	___
4AE8	Project	50	75	125	50	___	**04	**04	___
4AE9	Seminar	25	___	25	12	___	___	___	___
	Total			750		25	08		

* Elective II 1) Neural Networks 2) Digital Image Processing

* Indicates a load per practical batch.Actual load for practical shall be calculated by multiplying with number of practical batches.

** Indicates a load per project batch.Actual load for project shall be calculated by multiplying with number of project batches.

AMRAVATI UNIVERSITY, AMRAVATI

*% ORDINANCE NO. 13 OF 1985

Examinations leading to the Degree of Master of Science
in Applied Electronics (Bi-Annual Pattern)
(Two Year Course) Ordinance, 1985.

1. This Ordinance may be called Ordinance relating to the Examinations leading to the Degree of Master of Science in Applied Electronics, 1985.

2. This Ordinance shall come into force from Academic Session 1985-86 for First Year M.Sc. (Applied Electronics) and from 1986-87 for Second Year M.Sc. (Applied Electronics).

3. In this Ordinance the letters, words, figures:-

   (a) "B.Sc." of this University with Physics or Electronics or Computer Science with Mathematics at +2 level as one of the subjects or Bachelor of Computer Science .

   OR

   Degree of any other Statutory University recognised by Amravati University as equivalent thereto.

   (b) "University" means Amravati University.

4. The Degree of Master of Science in Applied Electronics shall be awarded to an examinee who, in accordance with the provisions of this ordinance qualifies himself/herself for the Degree.

5 (i) The duration of the course shall be two academic years.

   (ii) Courses of First Year M.Sc. and Second Year M.Sc. are divided into two parts every year i.e. Part-I and Part-II and the University shall hold examinations in Winter and in Summer every year for both the parts I and II.

   (iii) The main examination of Part-I shall be held in Winter and the main examination of Part-II shall be held in Summer every year. The supplementary examination for Part-I shall be held in Summer and the supplementary examination for Part-II shall be held in Winter every year.

6. For purpose of instruction and examination the student shall study sequentially.

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* As accepted by the Executive Council, dated 6.7.1985.

% As amended by Ordinance Nos . 1 of 2003 & 46 of 2005.

7. The period of Academic session/Term shall be such as may be notified by the University.

8. The examination referred to in para(5) above shall be held at such places and on such dates as may be notified by the university.

9. Subject to his/her compliance with the provisions of this Ordinance and of other Ordinances (Pertaining to examinations in General) in force from time to time, the applicant for admission, at the end of the course of study of a particular term shall be eligible to appear at it, if;

   i) he/she satisfied the conditions in the table and the provisions there under.

   ii) he/she has prosecuted a regular course of study in the University/College affiliated to the University.

   iii) he/she has in the opinion of the Head of the Department/ Principal shown satisfactory progress in his/her studies.

TABLE

Name of Exam	The student should have passed the examination of	The student should have completed the session/ term satisfactorily
First Year M.Sc.Part-I	B.Sc.or equivalent	First Year M.Sc.Part-I
First Year M.Sc.Part-II	____	First Year M.Sc.Part-I&II
Second Year M.Sc.Part-I	____	Second Year M.Sc.Part-I
Second Year M.Sc.Part-II	____	Second Year M.Sc.Part-I&II

10. The papers and practicals in which an examinee is to be examined, the maximum marks for these and the minimum pass marks which an examinee must obtain in order to pass in the subjects and the examination are detailed in examination scheme.

11. i) The scope of the subject shall be indicated in the syllabus.

    ii) The medium of instruction and examination shall be English

12. There shall be no classification of examinees successful in First Year M.Sc.Part-I examination, First Year M.Sc.Part-II exam., Second Year M.Sc. Part-I exam. and Second Year M.Sc. Part-II exam separately.

13. Examinees who are successful in Second Year M.Sc.(AE) Part-II examination all other three previous examinations and have obtained not less than 60% marks in aggregate of First Year Part-I, First Year Part-II, Second Year-I and Second Year Part-II examinations taken together shall be placed in First Division, those who have obtained less than 60% but not less 48% in Second Division and all other successful examinees in Third Division.

14. An examinee at First Year M.Sc. Part-I, First Year M.Sc. Part-II, Second year M.Sc. Part-I and Second Year M.Sc.Part-II examination shall have the option of not being declared successful at the examination in case he/she dose not secure a minimum of Second Division marks at the examination. The option will have to be exercised every time an application is submitted to any of these examinations and shall be on the proforma printed on the application form itself. Once exercised, the option shall be binding upon the examinee and shall not be revoked under any circumstances.

15. Any candidate who has obtained a Third Division at the M.Sc. examination of this University shall be eligible to take the examination again under this Ordinance in the same subject or group of subjects as the case may be for improving the Division. In such case, the provision of Ordinance No. 138 relating to the improvement of Division shall apply.

16. The provision of Ordinance No. 7-A relating to the condonation of deficiency of marks for passing examination and Ordinance No. 10 relating to exemption and compartment shall apply to the examinations under this Ordinance.

17. An examinee who dose not pass or who fails to present himself/ herself for the examination shall be eligible for readmission to the same examination, on payment of fresh fess and such other fees as may be prescribed.

18. As soon as possible after the examinations, the Executive council shall publish a result of the examinee. The result of Final M.Sc. examinations shall be classified as above and merit list shall be notified as per Ordinance No.6.

19. Notwithstanding anything to the contrary in this Ordinance no one shall be admitted to an examination under this Ordinance, if he/ she has already passed the same examination or an equivalent examination of any statutory University.

20 i) The examinees who have passed in all the subjects prescribed for all the examinations shall be eligible for award of the Degree of Master of Science in Applied Electronics.

ii) The Degree Certificate in the prescribed form, shall be signed by the Vice-Chancellor.

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% REGULATION NO. 19 OF 2002

Examinations leading to the Degree of Master of Science in Applied Electronics (Bi-Annual Pattern) (Two Year Course) Regulation, 2002.

Whereas it is expedient to make the Regulation in respect of Examinations leading to the Degree of Master of Science in Applied Electronics (Bi-Annual Pattern) (Two Year Course) for the purposes hereinafter appearing, the Management Council is hereby pleased to make a following Regulation.

1. This regulation may be called "Examinations leading to the Degree of Master of Science in Applied Electronics (Bi-Annual Pattern) (Two Year Course) Regulation, 2002.

2. This Regulation shall come into force w.e.f. the date of its approval by the Management Council.

3. The Schemes of Teachings and Examinations for Ist to IVth Semester in respect of Master of Science in Applied Electronics (Bi-Annual Pattern) (Two Year Course) shall be as per Appendix-A appended with this Regulation.

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% As amended vide Regulation No. 29 of 2005.