SEMESTER – III

SEMESTER – III

Numerical Analysis & Computer Programming AS (ID) – 3001

Course Code	**AS (ID) – 3001**	Credits : 4	**L-3, T-1, P-0**
Name of the Course	**Numerical Analysis & Computer Programming**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			**Max. Marks: 50**

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

2. **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION – A

INTRODUCTION TO COMPUTER PROGRAMMING: Review of computer programming in C and C++ languages. Arithmetic expressions, simple programs. The emphasis should be more on programming techniques rather than the language itself.

FINITE DIFFERENCES & INTERPOLATION : Various difference operators and relation between them. Newton's forward and backward interpolation formulae. Central difference Interpolation formula. Gauss's forward and backward interpolation formulae. Lagrenge's interpolation formula and Newton's divided difference formulae.

SECTION- B

SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS : Bisection method, method of false position, secant method, Iteration method, Newton-Raphson method, Generalized Newton-Raphson method.

SOLUTION OF SIMULTANEOUS ALGEBRAIC EQUATIONS : Jacobi's method, Gauss-seidal method, relaxation method.

SECTION – C

NUMERICAL DIFFERENTIATION AND INTEGRATION: Formulae for derivatives. Trapezoidal rule, Simpson's $1/3^{rd}$ and $3/8^{th}$ rules, Boole's and Weddle's rules, Romberg's integration.

SECTION – D

NUMERICAL SOLUTION OF P.D.E.: Finite difference approximations of partial derivatives, solution of Laplace equation (Standard 5-point formula only) One-dimensional heat equation (Schmidt method, Crank – Nicolson DuFort method and Frankel method) and wave equation.

Text books:

1. Numerical Methods in Engg. & Sciences : B.S.Grewal : Khanna Publishers.

2. Numerical methods for Scientific & Engg. Computations: M.K.Jain, S.R.K.Iyengar & R.K.Jain; Wiley Eastern Ltd.

Reference books:

1. Computer Oriented Numerical methods : U.Rajaramanm Orebtuce; Hall of India.
2. Introduction to Numerical Analysis: C.E.Froberg; Addison Wesley.

NOTE:

Students will be asked to write computer program of problems discussed. In c/c++.

SEMESTER – III

Principles of Engineering Economics and Management AS (ID) – 3002

Course Code	**AS (ID) – 3002**	Credits : 4	L-3, T-1, P-0
Name of the Course	**Principles of Engineering Economics and Management**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time = 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			**Max. Marks: 50**

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

2. **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION - A

ECONOMICS

Definitions, Nature & scope of Economics, Economics Systems-meaning of Capitalism, Socialism & mixed economy.

DEMAND AND SUPPLIES ANALYSIS

Law of demand and supply, exception to the law of demand, Elasticity of demand and supply and their types, Methods of measuring elasticity of demand and supply.

SECTION - B

THEORY OF PRODUCTION

Scales of production, Law of returns, Break even analysis.

MONETARY SYSTEM

Monetary policy – Meaning, objectives, methods, Fiscal policy – Meaning & objectives of fiscal policy in a developing country like India, Functions of Reserve Bank of India and commercial banks.

ECONOMICS & BUSINESS ENVIRONMENT

Privatization –Growth of private capitalism in India, Business/Trade Cycles – Meaning, Characteristics & classification, foreign capital & economic development.

SECTION - C

MANAGEMENT PRINCIPLES

Meaning & types of Management, Concept of Scientific Management, Management By Objectives, System Approach to Management.

FINANCIAL MANAGEMENT

Meaning, functional areas of financial management, Sources of Finance, Meaning of financial accounting, accounting principles-concepts & conventions, Importance of final

accounts – profit & loss a/c and balance sheet, Need and importance of capital budgeting.

MARKETING MANAGEMENT

Introduction to marketing management, Market segmentation, Developing & managing advertising programs, Deciding on media & measuring effectiveness.

SECTION - D

PRODUCTION MANAGEMENT

Procedure for production planning & Control, Plant Location & Lay-out, Routing, Scheduling, CPM & PERT,

QUALITY MANAGEMENT

Statistical Quality Control,

Introduction

Control Charts, X Charts, R Charts, Control Charts for C (N. of defects per unit), Control chart for P(Fraction Defective), Advantages & Limitations of SQC

Quality Circles:- Structure, functions & Limitations.

Text Books :-

1. Business Organisation & Management – B.P.Singh – T.N.Chabra – Dhanpat Rai & Sons.
2. Modern Economic Theory – K .K. Dewett – S.Chand & Co.

Reference Books :-

1. Marketing Management – Philip Kotler – Prentice Hall of India Pvt. Ltd.
2. Financial Management - I.M. Pandey - Vikas Publishing House Pvt. Ltd.
3. Indian Economic – Ruddar Dutt, K.P.M.Sundaram – S.Chand & Co.
4. Advanced Economic Theory – H.L.Ahuja – S.Chand & Co.
5. Production Operation Management.- Dr. B.S. Goel – Pragati Prakashan.
6. Statistical Quality Control – Grant, Leaven worth – Tata Mc. Graw Hill.
7. Personnel Management – Edwin B.Flippo – Tata Mc. Graw Hill.
8. Management – A Global Perespective – Harold Krontz – Tata Mc. Graw Hill.

SEMESTER – III

Digital Electronics **EC(ID) – 3001**

Course Code	**EC(ID) – 3001**	Credits : 4	L-3, T-1, P-0
Name of the Course	**Digital Electronics**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time=3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			**Max. Marks: 50**

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
2. **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION A

Binary, octal & Hexadecimal number systems and their inter conversion. Binary arithmetic (Addition & Subtraction, Multiplication & Division), 1's & 2's complements, 9's & 10's complement, BCD code, BCD Addition, Gray Code, Error Detection and Correction , Hamming code.

SECTION – B

Logic functions (OR, AND, NOT, NAND, NOR, XOR), Elements of Boolean Algebra (Theorems truth tables and relation's) Negative & Positive logic, Saturated & non saturated logic , fan in, fan-out, Logic IC's, de Morgan's Theorem, minterms and maxterms.

Karnaugh mapping, K-map representation of logical function for 2, 4 variable, simplification of Boolean equations with the help of K-map, Various minimization techniques, Quine's method and Quines Mc-Cluskey method, Half adder, full adder, half subtractor, full subtractor, serial and parallel binary adder.

SECTION – C

Introduction and performance criteria for logic families, various logic families - DCTL, RTL, DTL, TTL & EC working and their characteristics in brief, MOS Gates and GMOS Gates, comparison of various logic families.

SECTION – D

Various kinds of Flip-Flop: RS Flip-Flop, Clocked RS Flip-Flop, Edge triggered D Flip-Flop, Flip-Flop Switching time, J/K Flip-Flop, JK Master Slave Flip flop.

555 timer as an astable multivibrator, shift registers: serial in serial out, parallel in parallel out, Ring counters, asynchronous counters, synchronous counters.

D/A Converter, A/D Converter, clipping and clamping circuits, astable, monostable, bistable multivibrators using transistor.

BOOKS:

1. Malvino and Leach, Digital Principles and Applications.
2. Taub and Schilling, Digital Integrated Electronics.
3. Samuel C Lee, Digital Circuits and Logic Design 4.
4. Pulse, Digital and Switching Waveforms – Millman and Taub.
5. R.P.Jain – Modern Digital Electronics.

6. Floydd – Digital Fundamentals.
7. Malvino – Digital Electronics Principles.

SEMESTER – III

CIRCUIT THEORY **EE (ID) - 3001**

Course Code	**EE(ID) – 3001**	Credits : 4	L-3, T-1, P-0
Name of the Course	**CIRCUIT THEORY**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time= 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			**Max. Marks: 50**

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

2. **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION – A

Laplace Transformation: Laplace transformation and its applications to circuit theory in obtaining steady state and transient response of linear circuit.

Fourier Analysis: of complex waveform, solution of linear circuit impressed with complex waveform, power and power factor associated with complex wave.

SECTION- B

Two Port network:

Network elements, classification of networks, symmetrical two port network, Equivalent T and π representation in parameter form, ladder and lattice networks, Parameter representation: Z parameter (open circuit impedance parameter),

Y parameter (short circuit admittance parameter), Hybrid parameter (h- parameter representation), ABCD parameter representation, condition of reciprocity & symmetry in two port networks, different type of interconnection of two port network including series, parallel and cascade connection, iterative and image impedances.

SECTION-C

ANALYSIS OF NETWORK Using Graph Theory: Graph for given network, classification of graph and sub graphs, incidence , tie set and cut set matrices, terminology used in Network Graph, properties of tree in a graph, variable solution of network using graph theory and matrix from the concept of network function.

Coupling Circuit: Dot convention, coefficient of coupling, mutual inductances, loop and nodal equation for coupling circuits.

SECTION – D

Network Synthesis: Driving point functions, P.R functions , properties of P.R functions, Hurwitz polynomials, properties of Hurwitz polynomial functions, synthesis of reactive network by Foster & Cauer's method: Form-I & Form-II for LC networks,Synthesis of RC network by Foster & Cauer Form.

Books:

1. Circuit Theory By Chakravorty.
2. Network and Circuit by A.Sudhakar,Tata Mc Graw Hill.
3. Network Analysis by M.E Valkenburg.

4. Network Analysis by Sundaram Seshu & N Balbanian John.
5. Network Analysis and Synthesis by D Roy Choudhary.
6. Network Analysis and Synthesis By Soni Gupta.
7. Network Analysis by Schaum Series.

SEMESTER – III

COMMUNICATION THEORY **EC - 3002**

Course Code	**EC – 3002**	Credits : 4	L-3, T-1, P-0
Name of the Course	**Communication Theory**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time=3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

2. **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION – A

REPRESENTATION OF FREQUENCY AND TIME DOMAIN

Introduction to Information, message and signals, classification of signals. The discrete and continuous spectrum, power spectrum energy density spectrum, dirac-delta function, sampling theory and approximation.

SECTION – B

RANDOM SIGNAL THEORY

Discrete probability theory, continuous random variables, statistically independent random variable probability density functioning sums, transformation density function with discrete components, ergodic process, correlation function, spectral density with noise.

SECTION – C

NOISE

Atmospheric, thermal, shot and partition noise, figure and experimental determination of noise figure, shot noise in temperature-limited diode and space charge limited diodes, shot noise in triodes.

TRANSMISSION THROUGH NETWORKS

Networks with random input, auto correlation, spectral density and probability density I/P – O/P relationship, envelope of sine waves plus Guassian noise, optimum system and non-linear systems, max. Criterion, equivalent noise band width.

SECTION – D

BASIC INFORMATION THEORY

Definition of Information, Units of information, Entropy, Uncertainty and information rate of Communication, Redundancy, Relation between system capacity and information concept of message, discrete systems, discrete noisy channel, Continuous systems, comparison of existing system.

BOOKS:

1. Communication Systems : G.Kennedy.

2. Principles of Communication Systems: Taub & Schilling.
3. Communication Systems: B.P.Lathi.
4. Signals and Systems : S. Haykin.
5. Information and Transmission : Schwartz.
6. Elements of Communication Theory : J.C.Hancock.

SEMESTER – III

ANALOG ELECTRONICS CIRCUITS **EC - 3003**

Course Code	**EC – 3003**	Credits : 4	L-3, T-1, P-0
Name of the Course	**Analog Electronics Circuits**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time= 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			**Max. Marks: 50**

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

2. **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION – A

MULTISTAGE AMPLIFIERS

General cascaded systems, RC Coupled amplifiers, Transformers coupled amplifiers, direct-coupled amplifiers, cascaded amplifiers, Darlington compound configuration, Multistage frequency effects.

SECTION – B

HIGH FREQUENCY RESPONSE OF TRANSISTOR AMP.

High Freq. Model for CE amplifiers , approximate CE high freq. Model with resistive load , CE short circuit gain . HF Current gain with resistive load.

LARGE SIGNAL AMPLIFIER

Analysis and design of Class A , B , AB amplifiers , Push pull amplifiers , transformer less output stages, distortion calculations, high power amplifiers.

SECTION – C

TUNED AMPLIFIERS

General bahaviour of tuned amplifiers, Resonance, Series and parallel resonant circuit, calculations of circuit impedance at resonance. Variation of impedance with frequency, Q-Factor of a circuit and coil. Bandwidth of a series and parallel resonant circuit advantage and disadvantage of tuned amplifiers, single tuned amplifiers, voltage gain and frequency response of single tuned amplifiers , double tuned amplifiers , Analysis and design of Class C amplifiers.

WIDE BAND AMPLIFIERS

High freq. and low freq. Compensation, pulse rise-time and fall-time response, wideband amplifier using bipolar and FET devices.

SECTION – D

FEEDBACK AMPLIFIERS

Feedback concept, characteristics of negative and positive feedback, Effect on I/P & O/P impedances, gain freq. response and noise.

REGULATED POWER SUPPLIES

Unregulated power supplies, Zener diode voltage regulators, and transistor series and shunt regulators. OPAMP voltage regulators, IC voltage regulators. Introduction to SMPS.

BOOKS:

1. Electronic devices and Circuit Theory: Boylstad & Naschelsky
2. Electronic circuits : Schilling and Belove.
3. Electronic Devices & Circuits : Millman & Halkias.

SEMESTER – III

Numerical Analysis & Computer Programming Lab AS (ID)- 3003

Course Code	**AS (ID) – 3003**		Credits : 2	L-0, T-0, P-3
Name of the Course	**Numerical Analysis & Computer Programming Lab**			
Lectures to be delivered	**39 hours of Lab sessions**			
Semester End Examination	**Max. Time : 3 hrs**	**Max. Marks : 50**		**Min. Pass Marks : 20**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**		**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

i) Performing a practical examination assigned by the examiner (25 marks).
ii) Viva-voce examination (25 marks).

Viva-voce examination will be related to the practicals performed/projects executed by the candidate related to the paper during the course of the semester.

WRITE DOWN AND EXECUTE FOLLOWING PROGRAMS USING C/C++ LANGUAGE

1. To find the roots of non-linear equation using Bisection method/Muller's method.
2. To find the roots of non-linear equation using Newton's method/Muller's method.
3. Curve fitting by least-squares approximations.
4. To solve the system of linear equations using Gauss-Elimination method.
5. To solve the system of linear equations using Gauss-Seidal iteration method.
6. To solve the system of linear equations using Gauss-Jordan method.
7. To solve integral equation numerically using Trapezoidal rule.
8. To solve integral equation numerically using Simpson's rule.
9. Find the largest Eigen value of a matrix by power – method.
10. To find numerical solution of ordinary differential equations by Euler's method.
11. To find numerical solution of ordinary differential equations by Runge-Kutta method.
12. To find numerical solution of partial differential equation/laplace equation/ wave equation/heat equation.
13. To find numerical solution of ordinary differential equations by Milne's method.
14. To solve a given problem using Newton's forward interpolation formula.
15. To solve a given problem using Lagrange's forward interpolation formula.

NOTE : Minimum 10 experiments are to be performed.

SEMESTER – III

DIGITAL ELECTRONICS LAB EC (ID) – 3004

Course Code	**EC (ID) – 3004**		Credits : 2	L-0, T-0, P-2
Name of the Course	**Digital Electronics Lab**			
Lectures to be delivered	**26 hours of Lab sessions**			
Semester End Examination	**Max. Time = 3 hrs.**	**Max. Marks: 50**		**Min. Pass Marks: 20**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**		**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

i) Performing a practical examination assigned by the examiner (25 marks).
ii) Viva-voice examination (25 marks).

Viva-voice examination will be related to the practicals performed/projects executed by the candidate related to the paper during the course of the semester.

LIST OF EXPERIMENTS

1. Verify truth tables of AND, OR, NOT, NAND, NOR and XOR gates.
2. Implement (i) half adder (ii) full adder using AND – OR gates.
3. Implement full adder using NAND gates as two level realization.
4. Implement full subtractor using 8 to 1 multiplexer.
5. Verify truth tables of RS & JK flip flops and convert JK flip fops into D type & T type flip fops.
6. Use 555 timer as (i) monostable (ii) astable multivibrator.
7. (a) Use of 4-bit shift register for shift left and shift right operations.
   (b) Use 4-bit shift register as a ring counter.
8. Implement mod – 10 counter and draw its output wave forms.
9. Implement 4-bit DAC using binary weighted resistance technique/R-2R ladder network technique.
10. Implement 8 – bit ADC using IC (ADC 0800/0801).
11. a) Implement (i) Single level clipping circuit (ii) Two level clipping circuit.
    a. Implement clamping circuit to clamp, at peak +ve voltage/peak –ve voltage of an input signal.

ADDITIONAL EXERCISES:

1. Construct bounce less switch.
2. Construct a pulser of 1 Hz and 10 Hz, 1k Hz and manual.
3. Construct logic state detector.
4. Construct opto – sensor based.
   a. Measurement rotational speed of motor.
   b. Measurement time elapse between two events.
   c. Measurement of linear velocity.
   d. Measurement of acceleration.

5. Construct a memory using TTL Circuits. Read and write data onto a memory from bus.
6. Construct a security latch that can be operated by an identity card.

NOTE:-Record to be maintained both electronically and hard copy for evaluation.

SEMESTER – III

ANALOG ELECTRONICS CIRCUITS LAB EC - 3005

Course Code	**EC – 3005**	Credits : 2	L-0, T-0, P-2
Name of the Course	**Analog Electronics Lab**		
Lectures to be delivered	**26 hours of Lab sessions**		
Semester End Examination	**Max. Time : 3 hrs**	**Max. Marks : 50**	**Min. Pass Marks: 20**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**	**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

i) Performing a practical examination assigned by the examiner (25 marks).
ii) Viva-voice examination (25 marks).

Viva-voce examination will be related to the practicals performed/projects executed by the candidate related to the paper during the course of the semester.

LIST OF EXPERIMENTS

1. UJT relaxation oscillator and its use as a triggering device.
2. To study amplifying action of CE transistor amplifier.
3. To determine the frequency response of a RC coupled common emitter amplifier.
4. To study frequency response of single tuned voltage amplifier.
   a) Inductively coupled.
   b) Capacitively coupled.
5. To study frequency response of Current Series Negative Feedback Amplifier.
6. To study frequency response of Voltage Shunt Negative Feedback Amplifier.
7. To study frequency response of Current Shunt Negative Feedback Amplifier.
8. To study performance of Class B Amplifier.
9. To study performance of Class C Amplifier.
10. To study the performance of Hartley & Colpitts Oscillators.
11. To study the performance of RC Phase Shift Oscillator.

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