

**VEER NARMAD SOUTH GUJARAT UNIVERSITY,**  
**SCHEME FOR TEACHING & EXAMINATION**  
**B.E.- II (Information Technology)**

B.E.II (IT) 4th Semester		Teaching Scheme			Examination Scheme						
					Theory Exam		Practical/Quiz/Viva/T.W. etc.				
Course	Course No.	L Hrs.	T Hrs.	P Hrs.	University Exam.		University Exam.		Tutorial	Cont. Evaluation	Total Marks
					Durati on Hrs.	Marks	Durati on Hrs.	Marks			
Electronics - II	EC 401 IT	3	1	2	3	100	3	30	25	20	75
Engineering Mathematics – III	ASH 402 CO/IT	3	2	0	3	100	0	0	50	0	50
Algorithm Analysis and Design	IT 403 IT	3	0	0	3	100	0	0	0	0	0
Principles of Programming Language	IT 404 IT	3	0	2	3	100	3	30	0	20	50
Digital Circuits	IT 405 IT	3	0	2	3	100	3	30	0	20	50
Computer Based Information Processing	EC 406 CO/IT	3	1	2	3	100	3	30	25	20	75
<b>TOTAL:</b>		<b>18</b>	<b>4</b>	<b>8</b>	<b>-</b>	<b>600</b>	<b>-</b>	<b>120</b>	<b>100</b>	<b>80</b>	<b>300</b>
<b>Total Contact Hours: 30</b>					<b>Total Marks: 900</b>						

# VEER NARMAD SOUTH GUJARAT UNIVERSITY

BE – III (IT)

Semester - IV

## ELECTRONICS-II: EC 401 IT

	Lecture	Tutorial	Practical
Teaching Hours	3	1	2
Examination Scheme Marks	100	Cont. Evaluation: 10 Examination: 15	Cont. Evaluation: 20 Examination: 30

(A) **THEORY:**

- (1) **Negative Feedback in Amplifiers:** Basic concepts of feedback amplifiers; Effect on gain; Input and output impedances of feedback amplifiers and characteristics of different feedback amplifier; Analysis of the basic feedback amplifier; Introduction to its design and its application.
- (2) **Audio Frequency Linear Power Amplifiers:** Introduction to Class A, B, AB and C operation; Class A common-emitter power amplifier; Transformer coupled amplifier; Class B push-pull power amplifier; Amplifiers using complementary symmetry; Class C amplifier; Power, Efficiency and figure of merit calculation (Class A, B, AB and C), Thermal design Considerations.
- (3) **Voltage Regulators:** Introduction; Basic Voltage regulator (series and shunt type); Fixed voltage regulator (3-terminal); Adjustable voltage regulator; over voltage and short circuit protection Using IC series 78XX, 79XX design example, Principle of SMPS.
- (4) **Operational Amplifiers and Wave form Generators:** Difference amplifier; Analysis of difference amplifier; Common mode rejection ratio; Characteristic and specifications of Op-amp; Concept of offset voltage and currents; application of op-amp; Differentiators; Integrators; Oscillators; Difference amplifier (using one, two and three op-amps), Instrumentation amplifiers; Multivibrators; Rectifiers and peak detectors; Active filters. Block Diagram of 555 Timer IC, Monostable and Astable Multivibrator, Frequency divider, square wave generator, Pulse stretcher

(B) **PRACTICALS:**

Based upon the theory course prescribed above.

(C) **TUTORIAL ASSIGNMENT:**

Based upon the theory course prescribed above.

(D) **REFERENCES:**

- (1) Millman & Halkias: Integrated Electronics, Tata McGraw-Hill Pub., 1992.
- (2) Ramakant A Gayakwad: Op-Amp & Linear Integrated Circuits, Pearson education, 4<sup>th</sup> Edition, 2001 Pub.
- (3) Botkar Integrated circuits; Khanna publications
- (4) Boylestad & Nashlesky: Electronic Devices & Circuit Theory, Prentice-Hall India, 8th edition 2000.
- (5) Millman Jacob, Arvin Grabel, Microelectronics, McGraw Hill
- (6) Sedra & Smith: Microelectronic Circuits, 4<sup>th</sup> Edition, 2000. Oxford University Press.
- (7) Coughlil Driscoll, Operational Amplifier and linear integrated Circuits, Pearson Edition, 2000.

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BE – III (IT)

Semester - IV

## ENGINEERING MATHEMATICS III: ASH 402 CO/IT

	Lecture	Tutorial	Practical
Teaching Hours	3	2	0
Examination Scheme Marks	100	Cont. Evaluation: 40 Examination: 60	Cont. Evaluation: 00 Examination: 00

(A) **THEORY:**

1. **Multiple Integrals:** Reorientation of concept of integrals, double and triple integrals, evaluation techniques, change of order of integration, integrals in polar and cylindrical coordinates, change of variables of multiple integrals, Application of double and triple integrals for evaluation of area, volume and mass.
2. **Vector Calculus:** Basic concepts of Vector calculus, line integrals, scalar and vector point functions, differential operator, gradient, directional derivative, divergence, curl and Laplacian with their properties and physical interpretation.
3. Surface integrals, Green's, Gauss and Stokes theorem (without proof), Applications.
4. **Gamma, Beta and Error functions:** Improper integrals and their convergence, Gamma and Beta functions and their properties, Error functions, Evaluation and application.
5. **Fourier Series:** Fourier expansion of functions with arbitrary period, in particular periodic functions with period  $2\pi$ , conditions of convergence, Fourier series of even and odd functions, Half range Fourier series.
6. **Partial Differential Equations (PDE):** Basic mathematical concepts, First order PDE of Lagrange's form,  $Pp + Qq = R$ , Second order pde of mathematical Physics (Heat, Wave and Laplace equation) with standard boundary conditions, Solution by separation of variable method using Fourier Series. Partial differential equation Modelling.
7. **Complex Variables:** Basic mathematical concepts, Analytic functions, C-R equations, Harmonic functions, Related problems; Linear transformations of complex domains, Some special transformations, bilinear transformation, Conformal Mapping and applications; complex integration including contour Integration (Simple cases).

(B) **TUTORIAL ASSIGNMENTS:**

Based upon the theory course prescribed above.

(C) **REFERENCES:**

1. Kreyszig: Advanced Engineering Mathematics, John Wiley, International Student Ed. (1995).
2. R. Wylle: Advanced Engineering Mathematics, Mc-Graw Hill, International Student Ed. (1993).

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# VEER NARMAD SOUTH GUJARAT UNIVERSITY

BE – III (IT)

Semester - IV

## ALGORITHM ANALYSIS & DESIGN: IT 403 IT

	Lecture	Tutorial	Practical
Teaching Hours	3	0	0
Examination Scheme Marks	100	Cont. Evaluation: 00 Examination: 00	Cont. Evaluation: 00 Examination: 00

1. **Introduction:** Concept of an algorithm, program, problem; Review of elementary data structures; Asymptotic Complexity, Asymptotic Notation, Priori/ Posteri analysis, Efficiency of algorithms, average case/worst case analysis.
2. **Solving Recurrences:** Intelligent guesswork, homogeneous recurrences, non-homogeneous recurrences, asymptotic recurrences, substitution method, iteration method, master method and master theorem. Deriving/Solving recurrence relations on various algorithms.
3. **Divide & Conquer:** General method - Control abstraction - MAXMin recurring relations; Sorting: Merge Sort, Quick Sort, Selection sort; computing time.
4. **Greedy method:** General details, Optional Storage on tapes; Knapsack problem - Job sequencing with deadlines - Merge patterns - Minimum Spanning trees - Shortest path.
5. **Dynamic Programming:** General details, multistage graphs; All pair shortest paths, Optimal binary search trees; 0/1 knapsack, Traveling Salesman Problem.
6. **Backtracking:** General details, Eight Queens problem, Sum of subsets - Graph coloring, Hamiltonian Cycles; Knapsack.
7. **Branch & Bound:** Method; 0/1 Knapsack problem, TSP.
8. **NP-Hard and NP-Complete theory:** Basic concepts; Non deterministic algorithms, NP-complete & NP-Hard theory - Example problems.
9. Advanced topics.

### REFERENCES:

1. Horowitz E & Sahni S - Fundamentals of Computer Algorithms, Galgotia Publications, Reprint 1996
2. Brassard & Bratley - Fundamentals of Algorithmics, PHI EEE. 1996
3. Thomas H. Cormen – Introduction to algorithms PHI, 1998.
4. Aho, Hopcroft, Ullman – The design and analysis of Computer Algorithms, Addison Wesley, 1990.

# VEER NARMAD SOUTH GUJARAT UNIVERSITY

BE – III (IT)

Semester - IV

## PRINCIPLES OF PROGRAMMING LANGUAGES: IT 404 IT

	Lecture	Tutorial	Practical
Teaching Hours	3	0	2
Examination Scheme Marks	100	Cont. Evaluation: 00 Examination: 00	Cont. Evaluation: 20 Examination: 30

### (A) THEORY:

1. **Introduction to programming languages:** Why study programming languages - Major influences on the design & evolution of the programming language- Language pedigrees & Brief Historical Perspective - Criteria for the design of the programming language - Effects of the environment on the programming languages - Paradigms of the programming languages - Software Development Process.
2. **Language Design Issues:** Properties of Data types - Specification & Implementation issues of data types; Major impact of the primitive data types; Data Aggregates methods; The concept of variable and their attributes; Evaluation and assessment of some type issues viz Static & Dynamic Type Checking, Type coercion, Type compatibility; Dealing with pointers; Binding & Their types.
3. **Abstraction in Programming languages -I:** Subprograms & programmer defined data types; Abstract Data Type: Evolution, Encapsulation & Information Hiding; Subprogram Definition as Data objects. Issues in Type Definition.
4. **Abstraction in Programming language - II:** ADT revisited - Inheritance: Derived Classes, Methods, Abstract Classes, Objects & Messages in typical OOL; Typical operators in OOL; Operator overloading & precedence; Typical function in OOL; Constructors & Destructors.
5. **Abstraction in Programming languages - III:** Inheritance: Extending Classes, Virtual Base Classes, Member Classes; Virtual functions, Pointers to Objects, Pointers to Derived Classes; Streams in OOL; Templates & Exception Handling.
6. **Symbolic Logic & Logics Programming:** Introduction, Propositional Logic, First Order Logic, Logical Consequence, Logic Program using Horn Clause Theory, Resolution, Unification, SLD Resolution for Propositional Logic; Prolog Programming Model, Syntax & Semantics of Prolog programs, Completeness of Prolog, Built-in functions, I/O Predicates, Problem Solving Techniques, Cuts & Negations, Side-effects using Prolog, Symbolic Computation using Prolog.
7. **Control Abstraction:** Sequence control within expressions - /sequencing with Non-arithmetic expressions - Sequence Control between statements; Subprogram Sequence Control: Co routines, Scheduled subprograms, Tasks.
8. **Data Abstraction:** Names & referencing environments - Static & Dynamic scope - Block Structure - Local Data & their referencing environments - Shared data in Subprograms - Parameters & transmission.
9. **Storage Management:** Major runtime elements that require storage - Programmer controlled & system controlled storage management - Stack based & Heap based storage management.

### (B) PRACTICALS:

Based upon the theory course prescribed above

(C) **REFERENCES:**

1. Programming Languages: Design & Implementation: T W Pratt & Zelkovitz, 4<sup>th</sup> Ed, 2001.
2. Programming in PROLOG - R P Suri, A H Wheeler Pub, 1995.
3. Programmomg in C++, 2nd Edition: Dewhurst & Stark, 2nd edition, 1995
4. JAVA The Complete Reference - P Naughton, TMH Pub. 4<sup>th</sup> edition, 2001.

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# VEER NARMAD SOUTH GUJARAT UNIVERSITY

BE – III (IT)

Semester - IV

## DIGITAL CIRCUITS: IT 405 IT

	Lecture	Tutorial	Practical
Teaching Hours	3	0	2
Examination Scheme Marks	100	Cont. Evaluation: 00 Examination: 00	Cont. Evaluation: 20 Examination: 30

(A) **THEORY:**

- (1) **Number Systems:** Decimal number system; Binary, octal and hexadecimal number systems; Conversion from one number to another number system; Addition, subtraction, multiplication and division using different number systems; Representation of binary number in sign-magnitude, sign 1's complement and sign 2's complement notation; Rules for addition and subtraction with complement representation; BCD, EBCDIC, ASCII, Extended ASCII, Gray and other codes.
- (2) **logic Families:** RTL, DTL, ECL, TTL, MOS and CMOS families – their characteristics and applications; Details of fan-in, fan-out, noise margin, speed – power product.
- (3) **Logic Gates And Boolean Algebra:** AND, OR, NOT, NAND, NOR, Ex-OR logic gates; Positive and negative logic; Fundamental concepts of Boolean algebra; Demorgan's laws; Principles of duality; Simplification of Boolean expressions; Canonical and standard forms for Boolean functions; SOP and POS forms; Realization of Boolean functions using only NAND and NOR gates.
- (4) **Boolean Function Minimization:** Objectives of the minimization procedures; Karnaugh map method; Don't care conditions; Quine-McCluskey tabulation method; Concept of prime implicants.
- (5) **Combinational Logic Circuits Using Discrete Logic Gates:** Half adder and full adder; Half subtractor and full subtractor; Parity generator and checker; Code converters; Binary multiplier; Majority circuits, magnitude comparator.
- (6) **Combinational Logic Circuit Using MSI Integrated Circuits:** Binary parallel adder; BCD adder; Encoder, priority encoder, decoder; Multiplexer and demultiplexer circuits; Implementation of Boolean functions using decoder and multiplexer; Arithmetic and logic unit; BCD to 7-segment decoder; Common anode and common cathode 7-segment displays; Random access memory (RAM), Read only memory and erasable programmable ROMS; Programmable logic array (PLA) and programmable array logic (PAL).
- (7) **Introduction To Sequential Logic Circuits:** Basic concepts of sequential circuits; Cross coupled SR flip-flop using NAND or NOR gates; JK flip-flop rise condition; Clocked flip-flop; D-type and Toggle flip-flops; Truth tables and excitation tables for flip-flops; Master slave configuration; Edge triggered and level triggered flip-flops; Elimination of switch bounce using flip-flops; Flip-flops with preset and clear.
- (8) **Sequential Logic Circuit Design:** Basic concepts of counters and registers; Binary counters; BCD counters; Up down counter; Johnson counter, module-n counter; Design of counter using state diagrams and table; Sequence generators; Shift left and right register; Registers with parallel load; Serial-in-parallel-out(SIPO) and parallel-in-serial-out(PISO); Register using different type of flip-flop; Sequence generator.

(B) **PRACTICALS:**

Based upon the theory course prescribed above

(C) **REFERENCES:**

(1) Morris Mano: Digital Logic and Computer Design, Prentice-Hall of India, 2000 Reprint.

(2) Bartee Thomas: Digital Computer Fundamentals, McGraw-Hill, 1995. 1<sup>st</sup> Edition.

(3) Taub And Schilling: Digital Integrated Electronics, McGraw-Hill, 1985.

(4) Richard Sandige: Modern Digital Design, McGraw-Hill, 1990.

(5) B. Holdsworth, Digital Logic Design, East-West Press, 1987 2<sup>nd</sup> Edition.

(6) Samuel C. Lee, Digital Circuits and Logic Design, Prentice – Hall India.

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# VEER NARMAD SOUTH GUJARAT UNIVERSITY

BE – III (IT)

Semester - IV

## COMPUTER BASED INFORMATION PROCESSING: EC 406 CO/IT

	Lecture	Tutorial	Practical
Teaching Hours	3	1	2
Examination Scheme Marks	100	Cont. Evaluation: 10 Examination: 15	Cont. Evaluation: 20 Examination: 30

(A) **THEORY:**

(1) **Introduction To Data Processing:** Data Processing Techniques; Traditional Data Processing & Data Base Processing Techniques; DBMS; Data Independence; Shared Data - Advantages of DBMS; Architecture of a typical DBMS; DDLs; DMLs; Query Languages; Embedded Query Languages.

(2) **Data Base Project Development Process:** Information Model; Universe of Discourse; Logical Database Design; Physical Data Base Design; Semantic Data Model; Relationships in SDM; Other Data Models; DBTG; Hierarchical Model; ER Model; ANSI/X3/SPARC Model; Relational Model; Comparison; Study of DBTG & Hierarchical Model only from comparison point of view; Super keys; Generalization & aggregation.

(3) System Flow Study of Commercial Applications like Payroll; Inventory control; Accounting; Sales; University Course Management etc. Implementation issues.

(4) Characteristics of secondary storage devices; file organization techniques; Performance of heap; sequential; indexed sequential hashed; multi-indexed; inverted; and multi-ring files ; B-trees use of files in data processing.

(5) Implementation of commercial systems like pay-roll; inventory control etc. with a typical DBMS package.

(B) **PRACTICALS:**

Based upon the theory course prescribed above

(C) **TUTORIAL ASSIGNMENTS:**

Based upon the theory course prescribed above.

**(D) REFERENCES:**

- (1) Majumdar A K & Bhattacharya P: Introduction to Data Base Management Systems, Tata McGraw- Hill, 1999 5<sup>th</sup> Edition
- (2) Korth & Schilberscatz: Data Base Systems Concepts, McGraw-Hill, IS 3<sup>rd</sup> edition, 1997 Reprint.
- (3) Naveen Prakash: Inroduction to Data Base Management Systems, Tata McGraw-Hill, 1991 edition, 1994 Reprint.
- (4) RAM: Computer Fundamental Architecture & Organization, Wiley Eastern Limited, 1992 reprint.
- (5) Vipul Lal: Inside Clipper 5, Tata McGraw Hill, 2001 Reprint.

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