ANNEXTURE I

GOA UNIVERSITY

SECOND YEAR OF BACHELOR'S DEGREE COURSE IN COMPUTER ENGINEERING

(Revised in 2007-08)

SCHEME OF INSTRUCTION AND EXAMINATION

SEMESTER III

Sub Code	Subjects	Scheme of Instruction Hrs/Week			Scheme of Examination					
		L	T	P	Th. Dur (Hrs)	Marks				
						Th.	S	P	O	Total
CE3.1AM3	Applied Mathematics III	3	1	0	3	100	20+5	-	-	125
CE3.2BC++	Basics Of C++	3	1	2	3	100	20+5	50	-	175
CE3.3PPL	Principles of Programming Languages	3	0	2	3	100	20+5	-	-	125
CE3.4CONT	Computer Oriented Numerical Techniques	3	1	2	3	100	20+5		-	125
CE3.5LD	Logic Design	3	1	2	3	100	20+5	50		175
CE3.6IE	Integrated Electronics	3	1	2	3	100	20+5	-		125
	TOTAL	18	05	10	-	600	150	100	0	850

L-Lectures, T-Tutorials P-Practicals

Th-.Dur.- Duration of Theory paper

Th-Theory, S-Sessional, P-Practical, O-Oral.

25 Sessional marks will be split as follows:

20 marks are for the Internal Test

5 marks are for continuous evaluation of Practicals/Assignments

CE3.1AM3 APPLIED MATHEMATICS III

Lectures per week	:	3+1+0
Max. Marks for Theory paper	:	100
Max. Marks for Sessionals	:	20 + 5
Duration of paper	:	3 hours
Total no. of modules	:	4
No. of questions from each module	:	2
Total no. of questions to be answered	:	5

(At least one question from each module with two compulsory questions from any one module.)

MODULE 1 (11 Hrs)

Linear Algebra: Types of matrices, adjoint, inverse, elementary transformations, normal form-rank systems of equations AX = B and AX = 0, Linearly independent systems, Eigen values – Eigen vectors, Cayley Hamilton Theorem, minimal equation, diagonalisation, functions of matrices.

MODULE 2 (11 Hrs)

Probability Distributions: Definition, properties, discrete/continuous distributions Binomial, Poisson, Multinomial, Uniform, Normal, Exponential, Gamma . Samples – tests on large samples, correlation and regression.

MODULE 3 (11 Hrs)

Transforms:

Laplace Transforms – Definition, properties, inverse, convolution – periodic functions, applications.

Fourier transforms- Definition, properties, inverse, convolution – periodic functions, applications.

MODULE 4 (11 Hrs)

Transforms: Fourier and Z- Transforms – Definition, properties, inverse, convolution – periodic functions, applications.

TEXT BOOKS:

1. A Text Book of Matrices – Shanti Narayan, S. Chand & Company
2. Statistical Methods - Gupta S.P, S. Chand & Sons.
3. System and Signal Analysis – Chi – Tsong Chen, Holt, Rinse Hart and Winston Inc. (Sections: 4.1 – 4.8, 5.1 – 5.6, 6.4 – 6.6 of T.B: 3)

REFERENCE BOOKS:

1. Advanced Engineering Mathematics – Kreyazig Wiley

2. Engineering Mathematics Vol. III – P. Kandasamy et all, S.Chand & Co., New Delhi.

CE 3.2BC++ BASICS OF C++

Lectures per week : 3+1+2
Max. Marks for Theory paper : 100
Max. Marks for Practical : 50
Max. Marks for Sessionals : 20 + 5
Duration of paper : 3 hours
Total no. of modules : 4
No. of questions from each module : 2
Total no. of questions to be answered : 5
(At least one question from each module with two compulsory questions from any one module.)

MODULE 1

(3 Hrs)

C++ Overview and software development , C and C++ , Meaning of Object Oriented structured design v/s object oriented Design software construction overview.

(4 Hrs)

Data Types, Variables, Operators, simple I/O, Programming Fundamentals, Terminology, Format of C++ program, Programs and data, Data types in C++, Variable Declaration in C++, Operators in C++

(4Hrs)

Control statements and Loops, Relational and Logical Operators, if statements, switch statement, loops in general, for loop, while loop, do while loop

MODULE 2

POINTERS, ADDRESSES AND INDIRECTION (3 Hrs)

Importance of pointers, Data variables and memory, Address Operators, Pointers, Functions in C++, Efficient handling of large data structures, Arrays and classes

BASICS OF FUCTIONS (3 Hrs)

Functions in C++, Basic format, requirements for function writing, Local, static and global variables, Pointers and Functions.

ARRAYS (5 Hrs)

Using single Data Variables, Free pointer with every array, One Dimensional Arrays and Functions, Character strings, Multidimensional arrays, Multidimensional arrays and functions, Arrays out of bounds, Filling arrays from data files

MODULE 3

(2 Hrs)

User defined data types, struct and enums, Customized Data types, Data structures, Accessing structure elements, Structure arrays, Structures within structures, Copying structures, Call by reference, Structures arrays and functions, Enumerated Data types, Multifile programs

C++ Function enhancements (3 Hrs)

Function review, call by Reference using reference parameters, overloaded functions, Variable Length Parameter list functions, Inline functions

Classes and Objects **(**6 Hrs)

Object Oriented Principles and Definitions, Classes and objects, Writing member functions, Class constructors, class destructors, Array objects, overloaded operators and objects pointers and classes

MODULE 4

Class Relationship (3 Hrs)

Object model and class relationships using C++ language classes, User defined classes

Inheritance and virtual functions (4 Hrs)

Importance of Inheritance, Inheritance basics, Access Specifier basics, Multiple inheritance, Inheritance, constructors and destructors, Inheritance Program Example, Polymorphism and Virtual functions

Advanced C++ Topics (4 Hrs)

Dynamic memory allocation, Allocating memory for 2-D and 3-D arrays, Exception handling

Text Books:

1) C++ Programming Today by Barbara Johnson by Pearson Education low price ed ISBN 81-297-0850-7

Reference Books:

1) Mastering C++ by K. R. Venugopal, Rajkumar and T. Ravishankar, Publication: Tata McGraw Hill, ISBN:0-07-463454-2

CE3.3PPL PRINCIPLES OF PROGRAMMING LANGUAGES

Lectures per week	:	3+0+2
Max. Marks for Theory paper	:	100
Max. Marks for Sessionals	:	20 + 5
Duration of paper	:	3 hours
Total no. of modules	:	4
No. of questions from each module	:	2
Total no. of questions to be answered	:	5

(At least one question from each module with two compulsory questions from any one module.)

Module 1

Study of Programming language, Language Design Issues: (3 Hrs)

Structure and Operation, Virtual Computer, Binding times, Language Paradigms

Language translation Issues: (5 Hrs)

Program Language syntax, Stages in translation, Formal translation models.

Data types: (1 Hrs)

Properties of types and objects, Elementary data types structural data types

Encapsulation: (2 Hrs)

Abstract data types, Encapsulation, sub programs, Type definitions.

Module 2

Sequence Control: (6 Hrs)

Implicit and Explicit sequence control, Sequence control, Sequence control for arithmetic and non arithmetic expressions, Sequence control between structures.

Sub program control: (5 Hrs)

Sub program sequence control attributes of Data Control, Shared data in subprograms

Module 3

Advances in language design: (4 Hrs)

Variation on sub-program, Parallel programming, Formal properties of languages, Language Semantics

Characteristics and features of procedural languages (7 Hrs)

Structural languages, Logic programming languages with reference to suitable example of each and comparison among different languages. Fortran, C, Prolog.

Module 4

Study and analysis: (11 Hrs)

Block structural language: Pascal
Object based languages: Ada, Smalltalk.
Functional Language: LISP

Text Book

1. Programming Languages: Design and Implementation-Terrence W.Pratt, Marvin V.Zelkowig, PHI

Reference Books

1. Fundamentals of Programming Languages- Horowitz, Galgotia Pub
2. Programming Languages-Tucker A.B. , ISE McGraw Hill

CE3.4CONT COMPUTER ORIENTED NUMERICAL TECHNIQUES

Lectures per week	:	3+1+2
Max. Marks for Theory paper	:	100
Max. Marks for Sessionals	:	20 + 5
Duration of paper	:	3 hours
Total no. of modules	:	4
No. of questions from each module	:	2
Total no. of questions to be answered	:	5

(At least one question from each module with two compulsory questions from any one module.)

MODULE 1 (11 Hrs)

Errors and Approximations:

Introduction, sources of errors, problems in computations, safeguards against errors, floating point arithmetic, absolute error, relative error, percentage error – calculations.

Solution of Algebraic & Transcendental equations in one variable:

Newton Raphson method, Regula Falsi method, Successive bisection, Secant method, Iterative method for solving non Linear Equations.

Solution of Linear Equation:

Solution by elimination: Basic Gauss elimination method, Gauss Elimination with pivoting, Gauss-Jordan method, Computation of matrix inverse using Gauss elimination.

MODULE 2 (11 Hrs)

Interpolation:

Newton's Interpolation formulae, Lagrange's interpolation, Newton's Divided difference Interpolation formula, Central differences, Bessel's formula, Stirling's formula, Extrapolation, Inverse interpolation.

Iterative Method for System of Linear & Non-Linear Equations:

Jacobi's method, Gauss Seidel Method, Eigen Values & Eigen Vectors

MODULE 3 (11 Hrs)

Boundary Values & Eigen Value Problems:

Shooting method, Finite difference method, Solving Eigen value problems, Polynomial method.

Numerical Differentiation:

Differentiating continuous functions, Differentiating tabulated functions, Difference tables.

Numerical Integration:

Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule, Romberg's formula, Higher order rules.

MODULE 4 (11 Hrs)

Numerical Solutions of Ordinary Differential Equations:

Picard's method, Euler's Method, Runge-Kutta method, Predictor-Corrector method, cubic spline method.

Numerical Solution of Partial Differential Equations:

Elliptic Equations, Parabolic Equations, Finite Differences.

Text Books:-

1. Numerical Algorithms – E.V. Krishnamurthy and Sen, PHI
2. Numerical Methods by E. Balaguruswamy, Tata Mc Graw Hill.
3. Introductory Methods of Numerical Analysis – S.S. Shastry, PHI

Reference Books:

1. Computer Oriented Numerical Methods – Rajaraman, PHI
2. First Course in Numerical Methods – A. Ratson, MGH
3. Numerical Methods in Engineering and Science – Dr. B.S, Grewal, Khana Publication

Term Work:

Suggestions for Practicals: 8-10 programs on above topics.

CE3.5LD LOGIC DESIGN

Lectures per week	:	3+1+2
Max. Marks for Theory paper	:	100
Max. Marks for Practicals	:	50
Max. Marks for Sessionals	:	20 + 5
Duration of paper	:	3 hours
Total no. of modules	:	4
No. of questions from each module	:	2
Total no. of questions to be answered	:	5

(At least one question from each module with two compulsory questions from any one module.)

MODULE I

Introduction (6 Hrs)

Digital concepts, Number systems and operations. Binary codes – error correction and detection codes
Logic gates – all basic gates and secondary gates.

Boolean algebra and logic simplification (5 Hrs)

Implementation using K- maps and Tabular method. Combinational logic analysis using NAND and NOR gates.

MODULE II

Combinational logic implementation (5 Hrs)

Adders, Subtractors, Comparators, Encoders, Decoders, Code converters, Multiplexers and De-multiplexers, Parity generators/checkers.

Latches, flip-flops (6 Hrs)

Basic latches, flip-flops; D flip-flop, JK flip-flop, Master slave JK flip-flop, T flip-flop. Flip-flop operating characteristics, conversion of one flip-flop to another. Flip-flop applications.

MODULE III

Counters (5 Hrs)

Asynchronous counter operation, types and their design. Synchronous counter operation and their design, Counter applications.

Shift register (6 Hrs)

Basic shift register function, SISO Shift register, SIPO Shift register, PISO Shift register, PIPO Shift register, Bidirectional shift register, Shift register counters.
Shift register applications.

MODULE IV

Sequential Machines (7 Hrs)

Finite state model, memory elements, synthesis of synchronous sequential circuits, problems and design.

Programmable logic devices (4 Hrs)

Programmable array logic (PAL), Field programmable logic array (FPLA)

Text books:

1. Digital Fundamentals – Thomas L. Floyd, Prentice Hall
2. Introduction to Digital circuits – A. Anand Kumar, PHI

Reference Books:

1. Modern Digital Electronics - R. P. Jain, TMH Publication
2. Digital Logic and Computer Design – Morris Mano, PHI Publication.
3. Digital Principles and Applications – Malvino & Leach, TMH Publication.

CE3.6IE INTEGRATED ELECTRONICS

Lectures per week	:	3+1+2
Max. Marks for Theory paper	:	100
Max. Marks for Sessionals	:	20 + 5
Duration of paper	:	3 hours
Total no. of modules	:	4
No. of questions from each module	:	2
Total no. of questions to be answered	:	5

(At least one question from each module with two compulsory questions from any one module.)

MODULE I (11 Hrs)

Operational Amplifiers: (5 Hrs)

Characteristics, features, OPAMP with Negative Feedback, Practical OPAMP characteristic, Frequency Response of OPAMP.

Applications: (6 Hrs)

Summer, Scaling, Averaging Amplifier, Instrumentation Amplifier, Differentiator, Integrator. Basic Comparator, Zero Crossing Detector, Schmitt Trigger

MODULE II (11 Hrs)

Voltage Regulators (4 Hrs)

Introduction, Series Voltage Regulator, IC voltage Regulators:IC723 , LM 105.

555 timer- Monostable and Astable operation/application (4 Hrs)

PLL- Basic Operation, Principle and applications. (3 Hrs)

MODULE III (11 Hrs)

Digital Logic Families

Bipolar Logic families, unipolar logic families, characteristics of Digital ICs
RTL gate(Logic Operations), DTL gate(Logic Operations)
HTL gate (logic generation), TTL gate operation, ECL gate
CMOS Inverter.

MODULE IV (11 Hrs)

A/D and D/A converter

Introduction
DAC- weighted resistor, R2R ladder network.
ADC: successive approximation, Dual-slope A/D converter
Voltage to frequency conveter.
Specifications of A/D and D/A converter

Text Books:

1. Module I : Op-Amp and Linear integrated circuits –Ramakant A. Gayakwad, II Edition., PHI
2. Module II: Integrated Circuits by K.R. Botkar
3. Module III: Modern Digital Electronics by R.P. Jain
4. Module IV: Modern Digital Electronics by R.P. Jain

Reference Books:

1. Integrated Electronics by Millman J. and Halkias CC
2. Digital Integrated Electronics by Taub H, Schilling D.