UNIVERSITY OF MUMBAI
No.UG /232 of 2008

CIRCULAR :

A reference is invited to the Ordinances, Regulations and syllabi relating to the Bachelor of Engineering degree course **vide** this office Circular No. UG/347 of 2002, dated 17th August, 2002 and the Principals of the affiliated Colleges in Engineering are hereby informed that the recommendation made by the Faculty of Technology at its meeting held on 26th March, 2008 has been accepted by the Academic Council at its meeting held on 15th April, 2008 **vide** item No.4.38 and that, in accordance therewith, the Scheme of Examination and syllabi for the Second Year (Sem. III & IV) leading to the B.E. degree course for the Information Technology is revised as per **Appendix** and that the same has been brought into force with effect from the academic year 2008-2009.

MUMBAI-400 032
10th June, 2008

for REGISTRAR

To,

The Principals of the affiliated colleges in Engineering.

A.C./4.38/15.4.2008

No.UG/232-A of 2008, MUMBAI-400 032 10th June,2008

Copy forwarded with compliments for information to :-

1) The Dean, Faculty of Technology,
2) The Chairman, Ad-hoc Board of Studies in Information Technology.
3) The Controller of Examinations,
4) The Co-Ordinator, University Computerization Centre,

for REGISTRAR

Copy to :-

The Director, Board of College and University Development, , the Deputy Registrar (Eligibility and Migration Section), the Director of Students Welfare, the Executive Secretary to the Vice-Chancellor, the Pro-Vice-Chancellor, the Registrar and the Assistant Registrar, Administrative sub-center, Ratnagiri for information . The Controller of Examinations (10 copies), the Finance and Accounts Officer (2 copies), Record Section (2 copies), Publications Section (5 copies), the Deputy Registrar, Enrolment, Eligibility and Migration Section (2 copies), the Deputy Registrar, Statistical Unit (2 copies), the Deputy Registrar (Accounts Section),Vidyanagari (2 copies), the Deputy Registrar, Affiliation Section (2 copies), the Director, Institute of Distance Education, (10 copies) the Director University Computer Center (IDE Building), Vidyanagari, (2 copies) the Deputy Registrar (Special Cell), the Deputy Registrar,(PRO) . the Assistant Registrar, Academic Authorities Unit (2 copies)and the Assistant Registrar, Executive Authorities Unit (2 copies) . They are requested to treat this as action taken report on the resolution adopted by the Academic Council referred to in the above Circular and that, no separate Action in connection the Assistant Registrar Constituent Colleges Unit (2 copies) PLEASE

Enclosure to Item No. 4.38
15.4.2008

UNIVERSITY OF MUMBAI

Revised Syllabus

and Scheme of Examination
For
The Second Year
(Sem.III & IV)
of the

B.E. Degree Course

in Information Technology

(With effect from the academic year 2008-2009)

SCHEME OF INSTRUCTIONS AND EXAMINATION (R-2007)

UNIVERSITY OF MUMBAI

COURSE: INFORMATION TECHNOLOGY

Second Year -Semester III

Sr. No	Subjects	Scheme of Instructions			Scheme of Examinations					
		Lect/ Week	Pract/ Week	Tuto/ Week	Theory Time	Theory Marks	T/W Marks	Practical Marks	Oral Marks	Total Marks
1	Applied Mathematics III	4	--	1*	3	100	25	--	--	125
2	Data structure and Algorithms	4	2	--	3	100	25	50		175
3	Electronic Devices and Circuits	4	2	--	3	100	25	--	25	150
4	Digital Logic Design and Applications	4	2	--	3	100	25	--	25	150
5	G U I and Database management	4	2	--	3	100	25	50	25	200
6	Communication & Presentation Techniques	2	--	2	--	--	50	--	--	50
	TOTAL	22	08	3	--	500	175	100	75	850

(* Applied Mathematics III Tutorial be conducted class/division wise not batch wise)

Second Year -Semester IV

Scheme of Instructions				Scheme of Examinations					
Subjects	Lect/ Week	Pract/ Week	Tuto/ Week	Theory Time	Theory Marks	T/W Marks	Practical Marks	Oral Marks	Total Marks
Computational Mathematics	4	--	1*	3	100	25	--	--	125
Principles of Communication Engineering	4	2	--	3	100	25	--	--	125
Microprocessors &Microcontrollers	4	2	--	3	100	25	--	-	125
Internet programming	2	4	--	3	100	25	25	25	175
Networking technology for digital devices	4	2	--	3	100	25	25	25	175
Financial Accounting & Management of technology innovation	4	--	1	3	100	25	--	--	125
TOTAL	22	10	2	--	600	150	50	50	850

(* Applied Mathematics III Tutorial be conducted class/division wise not batch wise)

APPLIED MATHEMATICS III

CLASS S.E. (INFORMATION TECHNOLOGY)
SEMESTER III

HOURS PER WEEK	LECTURES	:	04
	TUTORIALS	:	01
	PRACTICALS	:	

		HOURS	MARKS
EVALUATION SYSTEM:	THEORY	3	100
	PRACTICAL	-	-
	ORAL	-	--
	TERM WORK	-	25

1. Complex Variables:

- Functions of complex variables: Continuity and derivability of a function, Analytic functions, Necessary condition for f(z) to be analytic, sufficient conditions (without proof); Cauchy-Riemann equations in polar form, Harmonic functions, Orthogonal trajectories; Analytical and Milne-Thomson method to find f(z) from its real or imaginary parts.

- Complex Integration, Taylor's and Laurent's series (without proof),Cauchy's residue theorem(statement &application)

2. Fourier Series:

- Orthogonal and orthonormal functions, Sine and cosine function and their orthogonal properties, Expression for a function in a series of orthogonal functions

- Fourier series, Dirichlet's conditions, Fourier series of periodic function, Even and Odd functions, Half range sine and cosine series, Parseval's relations.

3. Laplace Transform:

- Laplace Transform of constant, trigonometric, exponential functions, shifting properties, Expressions (with proofs) for i) $L\{t^n f(t)\}$ ii) $L\{f(t)/t\}$ iii) $L\{\int f(u)du\}$ iv)

Heaviside unit step functions, Dirac delta functions and their Laplace transforms,

Laplace transform of periodic function.

Evaluation of inverse Laplace transforms, Partial fraction method, Convolution theorem.

Application to solve initial and boundary value problems involving ordinary differential equation with one dependent variable.

4. Matrices:

Types of matrices, Adjoint of a matrix , Elementary transformations of a matrix, Inverse of a Matrix using Elementary transformations , Reduction to normal form.,rank using normal form Systems of homogeneous and non homogeneous equations , their consistency and solution.

5. Scilab

Introduction toScilab: Mathematical Functions, Tools, Arrays & their applications.

▸QUESTION ON SCILAB SHOULD NOT BE ASKED IN UNIVERSITY (THEORY) EXAMINATION.

TEXT BOOKS:

1. P.N.Wartikar and J.N.Wartikar, "Elements of Applied Mathematics" Volume 1 and 2 , A.V.Griha,Pune

2. S.S.Shastri, "Engineering Mathematics" Vol-2, PHI, 2nd Edition, 1994.
3. Churchil, "Complex Variable",McGraw Hill, Tokyo.

REFERRENCES:

1. Shantinarayan, "Matrices",S.Chand Publication House , Delhi

2. Shantinarayan , "Theory of function of Complex Variable", S.Chand Publication House , Delhi

3. Schaum's Outline Series,McGraw Hill, "Laplace Transforms"

4. T.Veerarajan, "Engineering Mathematics",TMH

5. Dr.B.S.Grawal, "Higher Engineering Mathematics", Khanna Publications

6. Erwin Kreyszing, "Advanced Engineering Mathematics",Wiley India, 8th Edition

Books on SCILAB

1) Engineering and scientific computing with SCILAB
By Claude Gomez
ISBN 978-0-8176-4009-5
A Birkhauser Book
Also available at Kindle Edition
Amazon.com

2) Modeling and Simulation in SCILAB/ SCICOS
By Stephen Campbell, Jean- Philippe Chancelier and Ramine Nikoukhah

3) SCILAB – A hands on introduction
By Satish Annigeni
E-book downloadable from www.lulu.com/items/volume-34/419000

TERM WORK:

	Marks
1. Attendance (Theory and Practical)	05
2. Assignments & practical using MATLAB/scilab	10
3. Test (at least one)	10

The final certification and acceptance of TW ensures the satisfactory performance of Term Work and Minimum Passing in the TW.

Data Structure and Algorithms

CLASS S.E. (INFORMATION TECHNOLOGY)

SEMESTER III

HOURS PER WEEK	LECTURES	:	04
	TUTORIALS	:	--
	PRACTICALS	:	02

		HOURS	MARKS
EVALUATION SYSTEM:	THEORY	3	100
	PRACTICAL	3	50
	ORAL	-	-
	TERM WORK	-	25

1. Revisiting Java programming construct

Classes types, and objects , Methods, Expressions, Control flow, Arrays, input and output ,Packages, Utilities in the java . lang package

2. Object Oriented Design & Analysis of Algorithms

Inheritance, and polymorphism, Exceptions, Interfaces, Abstract Classes, and Casting, Recursion and Other Design patterns , Pseudo – Code, Simple justification Techniques

Measures algorithmic complexity , Space complexity, Time complexity, Some mathematics needed in measuring complexity, The big O-notation used in measuring complexity

3. Stacks, Queues, and Recursion

Recursion , Stacks , Queues , Linked Lists, Double – ended Queues

4. Vectors, Lists, and Sequences

Vectors and Array Lists , Lists, Sequences , Favorite lists and the move –to Front Heuristic

5. Trees

The tree Abstract Data Type, basic Algorithms on Tree, binary Tree, data Structures for representing Tree

6. Priority queues

The priority queues Abstract data Type, Implementing a Priority queues with a List

Heaps, Adaptable priority queues

7. Maps and dictionaries

The Map Abstract data Type , Hahs Tables, The dictionary data Type, Skip Lists, Extensions and Applications for dictionaries

8. Search Trees

Binary Search Trees, AVL Trees , Splay Trees , (2,4) Trees , Red – Black Trees , External searching in B- Trees

9. Sorting Sets, and Selection

Merge Sort, Heap Sort, Quick Sort, and A Lower Bound on comparison – Based Sorting

BUCKET Sort and radix Sort, the complexity of some sorting algorithms , omparison of Sorting Algorithms , The Set ADT and union / file Structures

10. Text Processing

String operations, Pattern Matching Algorithms, Tries, Text compression , Text similarity Testing

11. Graphs

The graph Abstract Data Type , Data Structures for Graphs , Graph Traversals

Directed Graphs, Weighted Graphs, Shortest Paths, Minimum spanning Trees

Text Book

1. Micheal T Goodrich , Roberto Tamassia,(2007) *Data Structure and Algorithm in Java* 3rd Edition Wiley India,
2. Langsam , Data Structure using JAVA, Pearson Education
3. Jhon R. HubbardSchaum's outline of data structures with JAVA, McGraw Hill
4. Hubbard, Data Structure with JAVA, Pearson Education

Reference book

- Adam Drozdek (2001)Data Sructures and Algorithms in JAVA,1st Edition, Singapore: Thomson Asia Pte Ltd (ISBN 0534-37668-1)
- Nell Data, Daniel T. Joyce, Chip Weems(2004) Object Oriented Data Structures Using JAVA, 1st Edition, New Delhi: Narosa Publishing House
- Knuth, Donald E. (1973). *The Art of Computer Programming, Volume 1/Fundamental Algorithms*, 3rd Edition, Addison-Wesley.

Term Work:

Term work shall consist of at least 20 debugged programs and one written test.

Distribution of marks for term work shall be as follows:

1. Attendance (Theory and Practical)	05 Marks
2. Laboratory work (Experiments and Journal)	10 Marks
3. Test (at least one)	10 Marks

The final certification and acceptance of TW ensures the satisfactory Performance of laboratory Work and Minimum Passing in the term work.

Electronic Devices and Circuits

CLASS S.E (INFORMATION TECHNOLOGY)
SEMESTER III

HOURS PER WEEK	LECTURES	04	
	TUTORIALS		
	PRACTICALS	02	
EVALUATION SYSTEM:	THEORY	HOURS	MARKS
	PRACTICAL	3	100
	ORAL	--	--
	TERM WORK	--	25
		--	25

Objective of the course: The course intends to provide an overview of the principles, operation and application of the analog building blocks for performing various functions. This first course relies on elementary treatment and qualitative analysis and makes use of simple models and equation to illustrate the concepts involved. Detailed knowledge of the device structure and imperfection are not to be considered.

1. Introduction to BJT amplifiers:

- Principle of operation of BJT, DC biasing, Fixed Bias , Collector to Base Bias, Voltage Divider Bias circuits
- Small signal operation and analysis of CE, CB, CC amplifier configuration,
- SPICE simulation example of amplifier

2. Differential Amplifiers:

- Types of differential amplifier, Differential amplifier with swamping resistors, DC analysis
- AC analysis, Differential gain, common mode gain, CMRR
- Constant current bias, current mirror circuits.
- SPICE simulation example of differential amplifier.

3. Operational Amplifiers and its general linear applications:

- Block diagram representation, Ideal Op-amp, Equivalent circuit, Open-loop configuration, Transfer characteristics. Op-amp with negative feedback, Frequency response. Popular Op-amp IC 741 specifications and performance characteristics.
- Basic op-amp applications: Adder, Scalar, Subtractor, Difference amplifier, I-V converter, V-I converters, Integrator, Differentiator, Instrumentation amplifier using 2 and 3 op-amp stages.
- SPICE simulation of Op-amp.

4. Active Filters and Oscillators:

- First order low pass Butterworth filter, Second order low pass Butterworth filter, First order high pass Butterworth filter, Second order high pass Butterworth filter , Band pass filter, Band reject filter , All pass filter
- Oscillator: principle, Phase shift oscillator, Wien bridge oscillator, Quadrature oscillator, amplitude stabilization in oscillators.
- SPICE simulation of Filters and Oscillators.

5. Signal generators and wave shaping circuits:

- Op-amp used as basic comparator, Zero crossing detector, Schmitt trigger comparator and transfer characteristics.
- Precision rectifier circuits, Peak detector, clamping circuit.
- Square wave generators, Triangular wave generator, Saw tooth wave generators
- Astable multivibrator , Monostable multivibrator
- Data Converters: Analog to digital converter and Digital to analog converter principles, D-A converter with binary weighted resistors, D-A converter with R-2R Ladders. Successive approximation A-D converter
- SPICE simulation examples.

Specialized IC applications:

- Timer IC 555 and its use as monostable and astable multivibrator, Specifications and performance characteristics.
- Voltage regulator IC 723 and its use as variable voltage regulator, Specifications and performance characteristics.

Text Books:

1. Ramakant A. Gayakwad, "OP-Amps and Linear Integrated Circuits", Pearson Education
2. D.Roy Choudhary and Shail Jain, " Linear Integrated Circuits", New Age International Publishers.
3. Sundaram Natarajan, 'Microelectronics Analysis and Design' Tata McGraw-Hill Publishing Company Limited
4. Adel S. Sedra and Kennrth C. Smith, ' Microelectronic Circuits' Fifth

   Edition Oxford University Press

5. David Bell " Electronic Devices and Circuits",Oxford University Press

References:

1. Jacob Millman, Christos C Halkias, Satyabrata JIT, "Millman's Electronic Devices and Circuits", McGraw Hill International Edition.
2. S Salivahanan, N Suresh Kumar, A Vallavaraj, "Electronic devices and circuits", Tata McGraw-Hill

Term Work:

Term work shall consist of at least 10 experiments and one written test.

Distribution of marks for term work shall be as follows:

1. Attendance (Theory and Practical) 05 Marks
2. Laboratory work (Experiments and Journal) 10 Marks
3. Test (at least one) 10 Marks

The final certification and acceptance of TW ensures the satisfactory performance of laboratory Work and Minimum Passing in the term work.

Digital Logic Design and Applications

CLASS S.E (INFORMATION TECHNOLOGY)
SEMESTER III

HOURS PER WEEK	LECTURES	:	04
	TUTORIALS	:	
	PRACTICALS	:	02

		HOURS	MARKS
EVALUATION SYSTEM:	THEORY	3	100
	PRACTICAL		
	ORAL	-	25
	TERM WORK	-	25

A basic course in digital electronic logic circuitry. This course will introduce the students to digital logic circuits. Basic logic elements such as AND, OR, NAND and NOR gates will be introduced and characterized. Combinational and Sequential logic circuits will be designed and analyzed in the lab. Implementation of digital circuits with the help of MSI ,LSI and VLSI technology is covered.

1. Number Systems: Decimal, Binary, Octal and Hexadecimal number system and conversion, Binary weighted codes and inter-conversion, Binary arithmetic including 1's Complement and 2's Complement, Error detection and correction codes.

2. Boolean Algebra and Combinational Logic: Boolean Algebra Theorems, Realization of switching functions using logic gates, canonical logic forms, sum of product & product of sums, Karnaugh maps, Simplification of expressions, Variable Entered Maps ,Quine-McCluskey minimization techniques, Mixed logic combinational circuits and multiple output functions.

3. Analysis and Design of Combinational Logic: Introduction to combinational circuit, Decoder, Encoder, Priority encoder, Multiplexers as function generators, Binary adder, Subtracter, BCD adder, Binary comparator, Arithmetic and logic units.

4. Sequential Logic: Sequential circuits, Flip-flops, Clocked and edge triggered flip-flops, Timing specifications , Asynchronous and synchronous counters, Counter design with state equations, Registers, Bidirectional Shift registers.

5. Programmable Logic Devices: PLAs ,PALs, CPLD, FPGA Architectures, Finite state machines- Mealy and Moore design, Introduction to VHDL, Implementation of above combinational and sequential circuits using VHDL, Examples of system design applications like Washing machine, Candy Vending machine, traffic lights

6. CAD Tools: Introduction to Computer Aided Synthesis and Optimization, Circuit models, Synthesis, Optimization, Computer Aided Simulation, Verification, Testing, and Design for Testability

RECCOMENDED BOOKS

1. Raj Kamal, "Digital Systems Principle and Design" ,Pearson Education
2. Balabaniam ,Carlson, "Digital Logic Design Principles"Wiley Publications
3. Morris Mano, "Digital Design",Third Edition, Pearson edition
4. R P Jain " Modern Digital Electronics", McGraw Hill.
5. D. P. Leach, A. P. Malvino, "Digital Principles and Applications", TMH.
6 Tocci, Digital systems: Principles and applications, Pearson
7. J. Bhasker, "A VHDL Primer",Third Edition.
8. Sudhakar Yalamanchili, "Introductory VHDL" John M. Yarbrough, Pearson Ed.

TERM WORK

1. Term work should consist of atleast 10 practical experiments.

2. A minimum of 4 experiments should be performed on VHDL and other stimulation Packages such as Tinapro, Multisim, Spice etc.

1. Attendance (Theory and Practical) 05 Marks

2. Laboratory work (Experiments and Journal) 10 Marks

3. Test (at least one) 10 Marks

The final certification and acceptance of TW ensures the satisfactory performance of laboratory Work and Minimum Passing in the term work.

Suggested Experiments

1. Study of basic Logic gates on IC"s
2. 2's complement subtraction using IC 7483
3. Study of ALU IC 74181 (Active high and Active low)
4. 4 bit magnitude comparator using 7485.
5. Stuy of flips flops using IC 74746
6. Mod -100 counter using IC 7490 and IC 7493
7. Study of bidirectional shift register IC 74194/7495
8. Basic logic gates on VHDL and implementation on CPLD/ FPGA
9. Design of BCD adder on any stimulation package
10. Implementation of Combinational circuits on VHDL
11. Implementation of Sequential circuits on VHDL
12. Study of basic system design eg. Traffic light control

G U I and Database management

CLASS S.E (INFORMATION TECHNOLOGY)
SEMESTER III

HOURS PER WEEK	LECTURES	:	04
	TUTORIALS	:	--
	PRACTICALS	:	02

		HOURS	MARKS
EVALUATION SYSTEM:	THEORY	3	100
	PRACTICAL	3	50
	ORAL	-	25
	TERM WORK	-	25

1. Data base concepts and Systems

Introduction- Purpose of Database Systems, Views of data, Data Models, Database language, Transaction Management, Storage Management, Database Administrator, Database Users, Overall System Structure, Different types of Database Systems.

2. E-R Model

Basic Concepts, Design Issues, Mapping Constraints, Keys, E-R Diagram, Weak Entity set, Extended E-R features, Design Of an E-R Database Schema, Reduction of an E-R schema to Tables

3. Relational Model

Structure of Relational Database, The Relational Algebra, Views SQL-Background, Basic Structure, SET operations, Aggregate functions, Null Values, Nested Sub queries, Derived Relations, Views, Modification of Database, Joined Relations, DDL, Other SQL features.

4. Transaction

Transaction Concepts, State, Implementations of Atomicity and durability, Concurrent Executions, Serializability, Recoverability, Transaction Definition in SQL.

5. Concurrency Control Lock based protocol, Timestamp based protocol, Validation based protocol, Deadlock Handing, Insert and Delete operations, Concurrency in index structure.

6. Recovery system

Failure classification, Recovery and Atomicity, Log based recovery, Shadow paging.

7. Graphical User Interface

Murphy 's Law of G U I Design, Features of G U I, Icons and graphics, Identifying visual cues, clear communication, color selection, GUI standard, planning GUI Design Work.

8. Visual programming

Sharing Data and Code

Working with Projects, Introduction to Basic language, Using inbuilt controls and ActiveX controls, creating and using classes, Introduction to Collections, Using and creating ActiveX Components, dynamic data exchange, object linking and embedding

Creating visual software entities

Working with text, graphics, working with files, file management, serial communication, multimedia control interfaces.

Programming for the Internet

Using ActiveX controls on the web-the internet transfer control for HTTP, FTP

Database programming

Data base basics, Visual Basic's database tools, Database designing and programming, DAO, RDO, ODBC,ADO, OLE DB, Relational databases, the Data Object Models, form and fields validation, Client Server Programming, COM-DCOM.

Text Book

1. An Introduction to Database System, C.J. Date Pearson Education
2. Database Systems and Concepts, Henry F. Korth, Sliberschatz, Sudarshan, McGraw Hill

3. GUI Design for dummies, IDG books.
4. Visual Basic 2005, How to program (3rd Edition) Deitel & Deitel, Pearson Education
5. Microsoft SQL Server 2000 Bible, Wiley
6. BALTER, MS SQL SERVER 2005 EXPRESS IN 24 Hours, Pearson Education

Reference

1. Beginning S Q L Server 2000 for Visual Basic Developers Willis thearon Shroff publishers & distributers
2. Fundamentals of Database Systems, Elmasri and Navathe Pearson Education
3. Database Management Systems Majumdar/ A K Bhattacharyya, Tata Mc Graw Hill

Term Work:

Term work shall consist of one mini project using Microsoft Visual Basic as Front End and Microsoft SQL Server as Backend. For eg.

1. Library Management System
2. Income Tax Calculation System
3. Payroll System
4. Merit List Management System
5. Inventory Management System

The software shall have following attributes

a. Multiple forms and MDI form
b. Menus, pull down menu and pop up menu
c. Database connectivity using command objects and connection objects
d. One list box populated by program code

Distribution of marks for term work shall be as follows:

1. Attendance (Theory and Practical) 05

2. Assignments & practical using SCILAB

3. Test (atleast one) 10

10

The final certification and acceptance of TW ensures the satisfactory performance of Term Work and Minimum Passing in the TW.

Communication & Presentation skills

CLASS S.E (INFORMATION TECHNOLOGY)

SEMESTER III

HOURS PER WEEK	LECTURES	:	02	
	TUTORIALS	:	02	
	PRACTICALS	:	--	
EVALUATION SYSTEM:			HOURS	MARKS
	THEORY		--	--
	PRACTICAL		--	--
	ORAL			
	TERM WORK		25	

Communication in a business organization:

Internal and external communication, Types of meetings, strategies for conducting successful business meetings, documentation (notice, agenda, minutes, resolution) of meetings. Introduction to modern communication techniques.

(e-mail, internet, video-conferencing, etc.) Legal and ethical issues in communication (Intellectual property rights: patents, TRIPS, Geographical indications).

Advanced technical writing:

Report writing: Definition and importance of reports, qualities of reports, language and style in reports, types of reports, formats (letter, memo, project-repots). Methods of compiling data for preparing report.

A computer-aided presentation of a technical project report based on survey-based or reference based topic. The topics are to be assigned to a group of 8-10 students. The written report should not exceed 20 printed pages.

Technical paper-writing, Writing business proposals.

Interpersonal skills:

Introduction to emotional intelligence, motivation, Negotiation and conflict resolution, Assertiveness, team-building, decision-making, time-management, persuasion

Presentation skills:

Elements of an effective presentation, Structure of a presentation, Presentation tools, Audience analysis, Language: Articulation, Good pronunciation, Voice quality, Modulation, Accent and Intonation.

Career skills:

Preparing resumes and cover letters. Types of Resumes, Interview techniques: Preparing for job interviews, facing an interview, verbal and non-verbal communication during interviews, observation sessions and role-play techniques to be used to demonstrate interview strategies (mock interviews).

Group discussion:

group discussions as part of selection process. Structure of a group discussion, Dynamics of group behavior, techniques for effective participation, Team work and use of body language.

Term work: Part-I (25 Marks): Assignments;

2 assignments on communication topics

3 assignments on report-writing

3 assignments on interpersonal skills

2 assignments on career skills

At least one class test (written)

Distribution of term work marks will be as follows:

Assignments : 10 marks

Written test : 10 marks

Attendance (Theory and Practical) : 05 marks

Term work: Part-II (25 Marks): Presentation;

Distribution of term work marks will be as follows:

Project report presentation : 15 marks

Group discussion : 10 marks

The final certification and acceptance of term-work ensures the satisfactory performance of laboratory work and minimum passing in the term-work.

Books recommended:

1. Fred Luthans: Organizational behavior, McGraw Hill
2. Lesikar and Petit, Report writing for business, Tata McGraw Hill
3. Huckin & Olsen, Technical writing and professional communcation, McGraw Hill
4. Wallace & Masters, Personal development for Life & work, Thomson Lerning.
5. Heta Murphy, Effective Business Communication, McGraw Hill
6. Raman and Sharma, Report writing.

Second Year -Semester IV

Scheme of Instructions				Scheme of Examinations					
Subjects	Lect/ Week	Pract/ Week	Tuto/ Week	Theory Time	Theory Marks	T/W Marks	Practical Marks	Oral Marks	Total Marks
Computational Mathematics	4	--	1*	3	100	25	--	--	125
Principles of Communication Engineering	4	2	--	3	100	25	--	--	125
Microprocessors &Microcontrollers	4	2	--	3	100	25	--	-	125
Internet programming	2	4	--	3	100	25	25	25	175
Networking technology for digital devices	4	2	--	3	100	25	25	25	175
Financial Accounting & Management of technology innovation	4	--	1	3	100	25	--	--	125
TOTAL	22	10	2	--	600	150	50	50	850

(* Applied Mathematics III Tutorial be conducted class/division wise not batch wise)

Computational Mathematics

CLASS S.E (INFORMATION TECHNOLOGY)
SEMESTER IV

HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:	--	
	PRACTICALS	:	02	
			HOURS	MARKS
EVALUATION SYSTEM:	THEORY		3	100
	PRACTICAL		-	--
	ORAL		-	--
	TERM WORK		-	25

1. Numerical Methods:

- Errors: Types and Estimation.
- Solutions to Transcendental and polynomial equations: Bisection method, Newton-

  Raphson method, Secant method
- Numerical Integration: Trapezoidal Rule, Simpson's 1/3 rd and 3/8 th rules.
- Solution to system of linear algebraic equations, Gauss elimination method, Gauss-

  Jordan elimination method, Gauss-Siedel iteration method.
- Interpolation: Linear interpolation, Higher order interpolation using Lagrange's &

  Newton's method, Finite difference operators and difference tables

2. Statistics:

- Probability
- Random variables: Discrete & Continuous random variables, Probability density function, Probability distribution of random variables, Expected value, Variance,
- Moments & moment generating functions, Relation between Raw moments & Central moments.
- Binomial, Poisson & Normal distributions for detailed study, Central Limit theorem (statement only) & problems based on this theorem.
- Fitting of curves: Least square method, Fitting the straight line & parabolic curve, Correlation, Covariance, Karl Pearson's coefficient & Spearman' s Rank correlation coefficient ,Regression coefficients & lines of regression.

3. Sampling Theory:

- Sampling distribution, Test of Hypothesis, Level of Significance, Critical Region, One Tailed & Two Tailed Test, Interval Estimation of Population Parameters, Test of Significance for large Samples & small Samples, Students 't' Distribution & its properties , Chi-Square Distribution & its properties, Test of the Goodness of Fit & Independence of Attributes, Contingency Table, Yates Correction

4.Mathematical Programming:

- Linear optimization problem, Formulation & Graphical solution , Basic solution & Feasible solution, Primal Simplex Method.

5. SCILAB Applications:

- Programming of Numerical Methods.
- Use of Scilab for solving system of linear equations.

•Use of Sciab in Curve Fitting.

•Use of Scilab for finding coefficient of correlation & regression coefficient.

QUESTION ON SCILAB SHOULD NOT BE ASKED IN UNIVERSITY (THEORY) EXAMINATION.

TEXT BOOKS:

1 P.N.Wartikar and J.N.Wartikar, "Elements of Applied Mathematics" Volume 1 and 2 , A.V.Griha,Pune

2. S.S.Shastri, "Engineering Mathematics" Vol-2,PHI,2nd Edition ,1994.

3. S.S.Shastri, "Introductory Methods of Numerical Methods", Vol-2, PHI, Second Edition, 1994

4.

6. Robert J.Schilling & Sandra L.Harris, "Applied Numerical Methods for Engineers using SCILAB & C " , Thomson Brooks/Cole

7 S.C.Gupta, V.K.Kapoor, "Fundamentals of Mathematical Statistics"

REFERRENCES:

1. **Shantinarayan, "Matrices",S.Chand Publication House , Delhi**

2. **T.Veerarajan, "Probability and Statistics",TMH**

3. Dr.B.S.Grawal, "Higher Engineering Mathematics", Khanna Publications

4. Erwin Kreyszing, "Advanced Engineering Mathematics",Wiley India, 8th Edition

5. John S. Mathews, "Numerical Methods for Mathematics,Science & Engineering"

TERM WORK:
Marks

1. Attendance (Theory and Practical) 05 Marks

2. Laboratory work (Experiments and Journal) 10 Marks

3. Test (at least one) 10 Marks

The final certification and acceptance of TW ensures the satisfactory performance of laboratory Work and Minimum Passing in the term

Principles of Communication Engineering

CLASS S.E. (INFORMATION TECHNOLOGY)
SEMESTER IV

HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:	--	
	PRACTICALS	:	02	
EVALUATION SYSTEM:	THEORY		HOURS	MARKS
	PRACTICAL		3	100
	ORAL		2	
	TERM WORK		-	
			-	25

1 Basic Communication Systems:

a. Basic block diagram of communication systems.
b. Types of communication channels and their characteristics
c. Frequency / Spectrum allocations and their application areas.
d. International standards for communication systems and frequency assignment.
e. Wireless communication systems.
f. Satellite communication systems.
g. Optical fiber communication systems.

2 Spectrum and Noise:

a) Fourier transforms, properties, energy and power density spectrum and applications.

b) Sources of noise – Active and passive device noise, Noise parameters like S/N ratio, Noise factor, Noise figure, Noise factor of cascaded network,

Noise temperature, and Noise bandwidth of system.

3 **Amplitude Modulation Techniques:**

a) AM-FC spectrum, bandwidth, power calculations and block diagrams of Low level & High level modulator. (No circuit level description)

b) AM-SC spectrum, bandwidth, waveforms, generation methods. Circuits of Balanced modulator and Ring modulator.

c. SSB-SC spectrum, bandwidth, waveforms, generation methods like Filter method, Phase shift method and Third method.

d. ISB with and without Pilot carrier.

4 **AM Receivers:**

a. AM detectors – diode detector, envelope detector and their limitations.
b. TRF Receiver, Super heterodyne Receiver and Double Conversion Receiver (only Block diagram approach)
c. Receiver parameters- sensitivity, selectivity, fidelity, SINAD and types of distortion.
d. Image frequency and its rejection and double spotting.
e. Principle of AGC and types of AGC
f. Product demodulator and Balanced demodulation of DSBSC.

5 **FM transmission and reception:**

a. Principle of FM- waveforms, spectrum, bandwidth
b. FM generation- Direct FM and Indirect FM
c. Principle of AFC
d. FM demodulation- Foster seely discriminator, Ratio detector and FM detection using PLL (only using Block diagram of PLL)
e. FM super heterodyne Receiver block diagram with waveforms.
f. Pre emphasis and de emphasis in FM, FM noise triangle
g. Comparison of AM and FM systems.

Pulse Modulation Techniques:

a. Sampling theorem for low pass signals with proof, anti aliasing filter.
b. PAM, PWM and PPM techniques (only block diagram and waveforms).
c. Source coding methods like PCM, DPCM, DM and ADM (only block diagram and waveforms)
d. Companding in PCM, Companding laws.
e. Basic digital Transmission methods- ASK, FSK and PSK with block diagram and waveforms.

Multiplexing Techniques:

a. FDM and FDMA
b. TDM and TDMA
c. Standard FDM and TDM systems (only block diagrams and waveforms)
d. Applications in satellite communication , optical communication and wireless communication

List of Experiments

a. Frequency response of RF Class C Amplifier
b. AMFC generation and Demodulation
c. AMSC generation and Demodulation
d. SSBSC generation and demodulation
e. FM generation and Demodulation
f. FM demodulation using PLL
g. Sampling of Analog signals
h. Pulse Analog Modulation and demodulation
i. TDM system
j. PCM coding and decoding
k. Delta modulation and Demodulation
l. ASK,FSK and PSK encoding and decoding

Text Books:

1. Communication systems engineering John G. Proakis, Masond Saleim (Pearson education)

2. Digital and Analog communication systems Leon.w. Couch , II edition
3. B.P. Lathi, Modern Digital and Analog Communication Systems ,Third Edition, Oxford University press

Term Work:

Term work shall consist of at least 10 experiments and one written test.

Distribution of marks for term work shall be as follows:

	Marks
1. Attendance (Theory and Practical)	05 Marks
2. Laboratory work (Experiments and Journal)	10 Marks
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Microprocessors & Microcontrollers

CLASS S.E. (INFORMATION TECHNOLOGY)

SEMESTER IV

HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:		
	PRACTICALS	:	02	
			HOURS	MARKS
EVALUATION SYSTEM:	THEORY		3	100
	PRACTICAL		--	--
	ORAL		-	--
	TERM WORK		-	25

1. Introduction to 8086 Microprocessor & Architecture

Introduction to Microprocessors, Architecture of 8086 family, 8086 Hardware Design, Minimum mode & Maximum mode of Operation. Study of bus controller 8288 & its use in maximum mode. System Timing diagram

2. 8086 Instruction Set & Programming :

Addressing modes, Instruction Set, Assembly Language Programming, Mixed Language Programming, Programs Based on Stacks, Strings, Procedures, Macros, Timers, Counters & delay

3. Introduction to 8051 Mcrocontrollers

Microprocessors vs microcontrollers, The 8051 microcontroller architecture ,8051 assembly language programming, jump, loop, and call instructions, i/o port programming, 8051 addressing modes, arithmetic & logic instructions and programs, 8051 programming in c

4. Hardware interfacing for microcontrollers

8051 hardware connection and Intel hex file ,8051 timer programming in assembly and c, 8051 serial port programming in assembly and c , interrupts programming in assembly and c, lcd and keyboard interfacing, adc, dac, and sensor interfacing, 8051 interfacing to external

memory, 8051 interfacing with the 8255, DS12887 RTC interfacing and programming, motor control: relay, pwm, dc, and stepper motors

5. Introduction to PIC microcontrollers

Introduction to Microchip PIC family of Microcontrollers and development tools. CPU architecture and instruction set, Harvard Architecture and Pipelining,

Program memory considerations, Register file structure and addressing modes, CPU

Registers, Instruction set.

Text Books

1. Microprocessors and Interfacing ,Douglas V Hall,T ata Mc Graw Hill

2. The 8051 Microcontroller and Embedded systems By Muhammad Ali Mazidi,

   Pearson Education Asia LPE

3. 8051 Microcontrollers programming and practice By Mike Predcko

4. Microchip Midrange Embedded Microcontrollers Handbook

5. Intel or Atmel MCS 51 Family Microcontrollers Data Sheets.

6. Design with PIC Microcontrollers By John B. Peatman, Pearson Education

   Asia. LPE

1. The 8086/8088 Family, John Uffenbuck, Pearson Media, LPE
2. Kenneth Ayala, The 8051 Microcontroller Architecture, Programming and application, Penram International.
3. Rajkamal, Embedded Systems, Tata McGraw Hill

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Experiments to be performed

At least 5 programs should be performed interfacing Microprocessor or Microcontroller with peripheral devices while 5 experiments of microprocessor and microcontrollers programming can be performed using assembler & simulator.

Internet Programming

CLASS S.E. (INFORMATION TECHNOLOGY)

SEMESTER IV

HOURS PER WEEK	LECTURES	:	02
	TUTORIALS	:	--
	PRACTICALS	:	04
		HOURS	MARKS
EVALUATION SYSTEM:	THEORY	3	100
	PRACTICAL	3	25
	ORAL	-	25
	TERM WORK	-	25

Objectives of the course: This course gives knowledge to create the web sites by using HTML, JAVA SCRIPT, CGI/PERL, JAVA SERVLETS, ASP, and JSP. This will be first step towards Web Technology and E-Commerce.

1. **INTRODUCTION TO WEB**: History, web system architecture, URL, Domain Name System, overview of HTTP,HTTP request-response, generation of dynamic web pages, cookies.

2. **MARKUP LANGUAGE**: **HTML**: Introduction, Basic HTML, Formatting and Fonts, Commenting Code, Anchors, Backgrounds, images, Hyperlinks, Lists, Tables, Frames, simple HTML Forms, XHTML.

3. **CASCADDING STYLE SHEET (CSS)**: The need for CSS, Introduction to CSS, Basic syntax and structure, using CSS. manipulating text, padding, lists, Positioning using CSS.

4. **JAVASCRIPT AND DHTML:** What is JavaScript?, How to develop JavaScript simple JavaScript, variables, functions, conditions, JavaScript and Objects, JavaScript's own Objects, the DOM and the Web browser Environment, forms and validation.

5. **SERVER SIDE PROGRAMMING I**: Introduction to Servlets in Java,

Active Server Pages (ASP): Objects; Queries & Forms; Java Server Pages (JSP)

6. **SERVER SIDE PROGRAMMING II: SESSION TRACKING:** Introduction, Traditional session tracking techniques, the servlet /ASP session tracking API.

7. **SERVER SIDE PROGRAMMING III: DATABASE CONNECTIVITY:** Introduction, Relational database systems, JDBC perspectives, JDBC program example.

8. **INTRODUCTION TO WEB EXTENSION:** XML, Introducing XSL, XML transformed, XSL elements, transforming with XSLT, XML with CSS, web feeds (RSS), Introduction to web services.

Text Book:

1. Ralph Moseley, Middlesex University, Developing Web Applications, Wiley publications.
2. Henry Chan, Raymond Lee, Tharam Dillon, E-Commerce Fundamentals and Applications, Wiley publications.
3. Craig D. Knuckles, David S. Yuen, Web Applications, Wiley publications.

REFERENCES:

1. Steven Holzner, "HTML Black Book" Dreamtech press.
2. Tom Negrino and Dori smith, "JAVA script for World Wide Web".

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Networking Technology for Digital Devices

CLASS S.E. (INFORMATION TECHNOLOGY)
SEMESTER IV

HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:	--	
	PRACTICALS	:	02	
EVALUATION SYSTEM:	THEORY		HOURS	MARKS
	PRACTICAL		3	100
	ORAL		3	25
	TERM WORK		-	25
			-	25

Distributed Computing

Fundamentals, what is Distributed Computing? Evolution of DCS, DC System Models, Advantages and Disadvantages of DCS, Comparison with Centralized OS , Network Concepts for distributed Computing: Data Link Layer Protocol, Network Layer Protocol, Transport Layer Protocol, Application Layer Protocol, Protocols for Distributed Systems, ATM Technology, Message Passing, Inter Process Communication, Issues in IPC, Synchronization, Buffering, Multigram Messages, Encoding & Decoding of Message Data, Process Addressing, Failure Handling. Remote Procedure Calls, RPC Models, Transparency of RPC, Implementing RPC Mechanism, Stub Generation, RPC Messages, Marshalling Arguments & Results, Server Management, Communication Protocol for RPC's , Client-Server binding, Introduction to CORBA, CORBA Overview, BOA & POA Generation, Evaluating BOA & POA Generation, Lifecycle of a CORBA Invocation

(II)Management of Networks

Introduction, History of Network Developments, Network Hardware, Network Software, OSI Reference Model (7 Layers), TCP/IP Reference Model, Queuing - Markovian Process.

The Physical Layer. The Theoretical Basis for Data communication: Fourier Analysis, etc. Transmission Media, Narrowband ISDN, Modulation, Multiplexing, Packet Switching, Circuit switching

The Data Link Layer, Data Link Layer design issues, Error detection & correction, Elementary Data Link Protocols, X.25 Protocol, Sliding Window protocols, Medium Access Sublayer, The channel Allocation Problem, ALOHA, Carrier Sense Multiple Access Protocols, Ethernet, Token bus and Token Ring (IEEE Standard 802 for LANs and MANs).

The Network Layer, Network Layer Design Issues, Routing, Types of Routing, Shortest Path Routing, General Principles of Congestion control, Network Layer in the Internet, The IP Protocol, IP Addresses, Subnets, Internet Control Protocols, OSPF, BGP

The Transport Layer, The TCP Service model, The TCP Protocol, The TCP Segment Header, TCP Connection Management, TCP Transmission Policy, TCP Congestion Control, Timer Management. The Application Layer, DNS, SNMP, SNMPv2

Network Management, Functions of Networks, Network Environments, Design Considerations, Performance, Monitoring, Fault Management, Maintenance, Security, Administration.

Recent Development in Network, Mobile Communication, Satellite Communication, Fiber Optics as a Communication Media ATM, Types of Services in ATM, Hubs, Gateways, Bridges etc,

Text Book

1. *Computer Networks, Andrew S. Tanenbaum, Pearson Education*

2. Distributed Operating Systems, P.K. Sinha, IEEE Press
3. Youlu Zheng / Shakil Akhtar, Networks for computer scientists, Oxford University press
4. Distributed Operating Systems, Andrew S. Tanenbaum, Pearson Education
5. Stallings, "Data and Computer Communication", Pearson Education
6. Douglas E. Comer, "Computer Networks and Internets" 4th ed, Pearson
7. Bertseakas and Galleger, "Data Networks" Pearson Education

Term Work

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Marks

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2. Laboratory work (Experiments and Journal) 10 Marks
3. Test (at least one) 10 Marks

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List of Experiments

1. program for client-server socket
2. program on Remote procedure call
3. Program for creating UDP Client/server and use it
4. program for Error detection &correction
5. program for finding shortest path using Dljkshtras Algorithm
6. Implementation of Bellman ford algorithm
7. Case Study on SNMP
8. Report (case study) CORBA technology
9. Implementation of Deffie-Hellman & RSA algorithm
10. Report on any advanced protocol.

Financial Accounting & Management of Technology Innovation				
CLASS S.E. (INFORMATION TECHNOLOGY) SEMESTER IV				
HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:	01	
	PRACTICALS	:		
			HOURS	MARKS
EVALUATION SYSTEM:	THEORY		3	100
	PRACTICAL		--	--
	ORAL		-	--
	TERM WORK		-	25

Part I

Introduction to accounting

Nature of accounting, financial accounting and management accounting, users account, types of accounts, accounting context

Financial accounting techniques

Introduction to financial accounting, language accounting, Double entry Book keeping , Profit and loss account, Balance Sheet, Preparing financial statements, partnership and limited companies, cash flow statement.

Accounting for Business Transactions

Voucher system, balancing an account, trial balance

Fixed Assets and Depreciation

Acquisition cost of fixed assets, revaluation of assets, depletion cost, depreciation expenses , depreciation methods, selection of depreciation methods

Inventory Valuation

jective of inventory management, controlling inventories, costing inventories

egulatory and conceptual frame works

easurement Systems, Annual reports, creative accounting, International ccounting

anagement accounting practices

roduction to management accounting, relation with financial accounting, sting, cost accounting, activity based costing, Budgeting as a planning and ontrol measure, short term costing, Management accounting, strategic anagement accounting

art II

nnovation / wealth creation process, three critical trajectories impacting the nnovation process creative transformations, the importance of technological nnovation, The impact of technological innovation on society.

ndustry dynamics of technological innovation, transcending creativity into nnovation, innovation as a collaborative effort

Type and patterns of innovation- Technology S curves, formulation of echnological innovation strategy, choosing innovative projects, collaborative strategies, implementing technological innovation strategies. Managing new product development

The role of technology in the creation of wealth, historical perspective, long-wave cycle, evolution of production technology, technology and national economy

Management of technology, the conceptual frame work, technology and society, knowledge and technology, technology and business

Textbook

1. Michael Jones, Accounting *for Non- Specialists, Wiley India*

2. *Paresh shah, Basic financial Accounting, Oxford University press*

3. Melissa A. Schilling, *strategic management of technological Innovation, New York University, McGraw-Hill*

4. *Tarek M. Khalil, Management of technology, McGraw Hill*

Term Work:

Term work shall consist of at least 10 experiments/ assignments and one written test.

Distribution of marks for term work shall be as follows:

	Marks
1. Attendance (Theory and Tutorial)	05 Marks
2. Assignments	10 Marks
3. Test (at least one)	10 Marks

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