

University of Mumbai
Bachelor of Science- Information Technology
Revised Syllabus with effect from 2010-11
Semester 1

Subjects (5 PAPERS)

Professional Communication skills

Applied Mathematics – I

Fundamentals of digital computing

Electronics and Communication technology

Introduction to C++ programming

CLASS: B. Sc (Information technology)		Semester – I	
SUBJECT: Professional Communication Skills			
Periods per week 1 Period is 50 minutes	Lecture	5	
	TW/Tutorial/Practical	3	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	TW/Tutorial/Practical	--	50

Unit – I	The Seven Cs of Effective Communication Completeness, Conciseness, Consideration, Concreteness, Clarity, Courtesy, Correctness
Unit- II	Communication: Its interpretation Basics, Nonverbal Communication, Barriers to Communication
Unit-III	Business Communication at Work Place: Letter Components and Layout, Planning a letter, Process of Letter writing, E-mail Communication, Memo and Memo reports, Employment Communication, Notice agenda and Minutes of meeting, Brochures
Unit-IV	Report Writing Effective writing, types of business reports, structure of reports, gathering information, organization of the material, writing abstracts and summaries, writing definitions, visual aids, user instruction manual.
Unit -V	Required Skills Reading skills, listening skills, note-making, précis writing, audiovisual aids, oral communication
Unit-VI	Mechanics of Writing Transitions, Spelling rules, hyphenation, transcribing numbers, Abbreviating technical and non-technical terms, Proof reading.

Text Books:

Professional Communication by Aruna Koneru, McGrawHill

Effective Business Communication by Herta A Murphy, Herbert W Hildebrandt, Jane P Thomas, McGrawHill

Reference Books:

Business Communication, Lesikar and Petit, McGrawHill

Communication Skills Handbook, Summers, Wiley, India

Business Communication (Revised Edition), Rai and Rai, Himalaya Publishing House

Business Correspondence and Report Writing by R. C. Sharma and Krishna Mohan, TMH.

Term Work and Tutorial

Should contain minimum 10 assignments and two class tests

Practical

None

CLASS: B. Sc (Information technology)		Semester – I	
SUBJECT: Applied Mathematics I			
Periods per week 1 Period is 50 minutes	Lecture	5	
	TW/Tutorial/Practical	3	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	TW/Tutorial/Practical	--	50

Unit – I	Matrices: Minors and Cofactors, Adjoint of a square matrix, Inverse of a matrix. Rank of a matrix, Solution of Homogeneous and non homogeneous linear Equations using Matrix method.
Unit- II	Eigen Values and Eigen Vectors: Vectors, linear combination of vectors, Inner Product of two vectors, characteristic equation, Eigen Vector, Cayley- Hamilton Theorem, Similarity of Matrices, Derogatory and Non-derogatory matrices, Complex Matrices: Hermitian, skew-Hermitian and Unitary matrices and their properties.
Unit -III	Vector Calculus: Vector Differentiation: Vector Operator Del, Gradient, and Geometrical Meaning of gradient, Divergence and Curl.
Unit - IV	Differential Equations: Differential Equations of 1 st order and 1 st degree and applications
Unit - V	Linear Differential Equations: Linear Differential equations with constant coefficient, Differential equations of higher order and applications.
Unit -VI	Successive differentiation, Mean Value theorems, Partial differentiation, Euler's Theorem, Approximation and errors, Maxima and Minima

Text Books:

Engineering Mathematics A tutorial approach by R. R. Singh and Mukul Bhatt, TMH 2010
Text Book of Applied Mathematics Vol I and Vol II. P.N. Wartikar & J.N. Wartikar, Pune Vidyarthi Griha Prakashan

References:

Higher Engineering Mathematics by B. V. Ramana, McGrawHill
Differential Calculus by Shanti Narayan. S. Chand.
Higher Engineering Mathematics by B.S. Grewal, Khanna Publications
Vector Analysis by Murray Spiegel, McGrawHill
Matrices by Vashistha, S. Chand

Term Work and Tutorial

Should contain minimum 10 assignments and two class tests

Practical

None

CLASS: B. Sc (Information technology)		Semester – I	
SUBJECT: Fundamentals of Digital Computing			
Periods per week 1 Period is 50 minutes	Lecture	5	
	TW/Tutorial/Practical	3	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	TW/Tutorial/Practical	--	50

Unit – I	<p>Data and Information Features of Digital Systems, Number Systems-Decimal, Binary, Octal, Hexadecimal and their inter conversions, Representation of Data: Signed Magnitude, one's complement and two's complement, Binary Arithmetic, Fixed point representation and Floating point representation of numbers.</p> <p>Codes BCD, XS-3, Gray code, hamming code, alphanumeric codes (ASCII, EBCDIC, UNICODE), Error detecting and error correcting codes.</p>
Unit- II	<p>Boolean Algebra: Basic gates (AND, OR, NOT gates), Universal gates (NAND and NOR gates), other gates (XOR, XNOR gates). Boolean identities, De Morgan Laws.</p> <p>Karnaugh maps: SOP and POS forms, Quine McClusky method.</p>
Unit -III	<p>Combinational Circuits: Half adder, full adder, code converters, combinational circuit design, Multiplexers and demultiplexers, encoders, decoders, Combinational design using mux and demux.</p>
Unit - IV	<p>Sequential Circuit Design: Flip flops (RS, Clocked RS, D, JK, JK Master Slave, T, Counters, Shift registers and their types, Counters: Synchronous and Asynchronous counters.</p>
Unit- V	<p>Computers: Basic Organisation, Memory: ROM, RAM, PROM, EPROM, EEPROM, Secondary Memory: Hard Disk and optical Disk, Cache Memory, I/O devices</p>
Unit -VI	<p>Operating Systems: Types (real Time, Single User / Single Tasking, Single user / Multi tasking, Multi user / Multi tasking, GUI based OS. Overview of desktop operating systems-Windows and LINUX.</p>

Text Books:

Modern Digital Electronics by R. P. Jain, 3rd Edition, McGraw Hill

Digital Design and Computer Organisation by Dr. N. S. Gill and J. B. Dixit, University Science Press

Linux Commands by Bryan Pfaffaenberger BPB Publications

UNIX by Sumitabha Das, TMH

References:

Digital Principles and Applications by Malvino and Leach, McGrawHill

Introduction to Computers by Peter Norton, McGraw Hill

Introduction to Computers by Balagurusamy

Term Work and Tutorial

Should contain minimum 5 assignments and two class tests

Practical (Minimum 8 expts.)

List of Practicals:

1. Study of logic gates (basic and universal)
2. Verify De Morgan's theorems

3. Design and implement Half adder and full adder using gates.
4. Design and implement binary to gray code converter and vice versa using XOR gates.
5. Design and implement multiplier for two 2-bit binary numbers using minimum number of gates.
6. Reduce the given numeric form using K-map and implement using gates.
7. Implement SOP /POS forms using logic gates.
8. Implement logic gates using multiplexers.
9. Implement expressions using multiplexers and demultiplexers
10. Implement 3-bit binary ripple counter using JK flip flops.

Linux

1. Installation of Linux
2. Study of Linux Commands with all switches:
ls, mkdir, cd, rmdir, wc, cat, mv, chmod, date, time, grep, tty, who, whoami, finger, pwd, man, cal, echo, ping, ifconfig, tar, telnet

CLASS: B. Sc (Information technology)		Semester – I	
SUBJECT: Electronics and Communication Technology			
Periods per week 1 Period is 50 minutes	Lecture	5	
	TW/Tutorial/Practical	3	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	TW/Tutorial/Practical	--	50

Unit – I	Concept of Conductor, Semiconductor, Insulator. Semiconductor Diode, Forward bias, Reverse Bias, Application of Diode as Rectifier, Zener diode and its applications, Introduction to Transistor (BJT, FET), PNP, NPN Transistors their Characteristic. Application of Transistor as amplifier and as a Switch.
Unit- II	Concept of amplification, amplifier notations, A_v , A_i , A_p , Z_i , Z_o , Application of BJT as single stage Amplifier, Frequency response of single stage Amplifier. Multistage Amplifiers:- (Basics concepts) RC coupled, cascade, Darlington pair, DC amplifiers.
Unit-III	Concept of Feedback:- Negative Feedback and its advantage in Amplification, Positive Feedback :- Oscillators, RC Phase Shift Oscillator, LC Oscillator. Switching Circuits Multivibrators : - Monostable using IC 555 and Astable using IC 555 (including problems)
Unit- IV	Introduction:- Need for modulation system, Concept of Modulation. AM :- Definition of AM, Modulation index, Power relation in AM, Generation and Demodulation of AM. SSB:- Power requirement in comparison with AM, Advantages of SSB over AM, Concept of Balanced Modulator, Generation of SSB, Pilot Carrier System, Independent Side System, Vestigial Sideband Transmission.
Unit- V	FM: - Definition of FM, Bandwidth, Noise triangle, Pre-emphasis and De-emphasis. PM: - Definition of PM. Difference between AM and FM. Radio receivers. Pulse Modulation:- Sampling Theorem, PAM, PTM, PWM, PPM, pulse code modulation, Quantization noise, companding, PCM system, differential PCM, Delta modulation. Multiplexing: - FDM/TDM. Television:- Scanning, Composite Video signal, Television Transmitter, television receiver.
Unit-VI	Introduction to Digital Communication: PSK, ASK, FSK. Introduction to fibre optics system:- Propagation of light in optical fibre; ray model . Types of fibre : Single mode, steps index. Graded index. Signal distortion: attenuation, dispersion. Optical sources: LED, LASERS. Optical Detectors and optics links. Link Budget.

References

Allen Mottershead, "Electronic Devices and Circuits", PHI
Boylstead and Neshelesky , "Electronics Devices and Circuits", 4th , PHI, 1999.
Simon Haykin, "An Introduction to Analog and Digital communications", John Wiley and Sons, 1994.
R.B Carlson, "Communication Systems", MacGraw Hill.
George Kennedy, "Electrical Communication systems", Tata McGraw Hill 1993.
Roody Collin, "Electronics Communication", PHI
J. Millman and A Grabel, " Microelectronics" MacGraw Hill 1988.
Proakis J. J, "Digital Communications" Mc Graw Hill.
Digital Communications by TAUB Schilling
Electronic Communication Systems, Roy Blake Delmar, Thompson Learning
Introduction To telecommunications, Anu A Gokhale, Delmar Thompson Learning

Term Work and tutorial**Should contain 5 assignments and two class tests****Practical: Should contain minimum 8 experiments.**

List of Practicals:

1. Study of Zener diode characteristics
2. Study of Half wave and full wave rectifiers
3. Study of bridge rectifier.
4. Study of Transistor as a switch
5. Monostable multivibrator using IC 555 timer.
6. Astable multivibrator using IC 555 timer.
7. Study of Wien bridge oscillator
8. Frequency Response of single stage transistor amplifier
9. Study of Amplitude Modulation
10. Study of Frequency Modulation
11. Study of Fibre Optic transmission
12. Study of Pulse Amplitude Modulation
13. Study of transistor DC Amplifier

CLASS: B. Sc (Information technology)		Semester – I	
SUBJECT: Introduction to C++ programming			
Periods per week 1 Period is 50 minutes	Lecture	5	
	TW/Tutorial/Practical	3	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	TW/Tutorial/Practical	--	50

Unit – I	Programming Logic and techniques Algorithms, Flow-charts, Program Design. Introduction to C++: Origin of C++, A Sample C++ program, pitfall and programming tips. Testing and Debugging.
Unit- II	C++ concepts Variables and Assignments: variables, identifiers, variable declarations, Assignment Statements, reference variable, symbolic constant. Input and Output: cin, cout, escape sequences, include directives and Namespaces, Indenting and Comments, Operator precedence. Data types and expressions, Arithmetic operators, Type compatibilities.
Unit-III	Flow of Control Compound statements Loops: while, for, do while , nested loops. Decision making: if – else, nested if else, switch , break and continue. Manipulators: endl , setw, sizeof. Increment and decrement operators. Type Cast Operators, Scope resolution operators
Unit- IV	Functions Function Prototypes , built in functions and user defined functions, Function overloading, Call by reference, Call by value, const member functions. Inline Functions and recursive functions, Math Library Functions.
Unit- V	Derived Data types (Arrays , pointers , functions) Introduction to arrays, arrays in functions, 2-D arrays , Multidimensional arrays. Introduction to pointers, void pointers, pointers in function, pointer to constant and constant pointer, generic pointer.
Unit-VI	Strings, Vectors and Structures String functions: strcmp, strcat, strlen, strcpy . Vector Basics. Introduction to Structures.

Books:

Problem Solving with C++ , Walter Savitch, Sixth Edition, Pearson Education.
J. R. Hubbard, Schaum’s outlines “Programming with C++”, Second Edition , Tata McGrawHill
Y.P.Kanetkar, “Let us C++” , seventh edition, BPB publication

Reference Books:

Object Oriented programming with C++ , E Balagurusamy , Third Edition , Tata McGraw Hill.
Object oriented programming with C++ Poonamchandra Sarang, PHI Second Edition.
Pure C++ programming , Amir Afzal, Pearson Education.
Computer Science – A structured Approach using C++ bu B. Forouzan, R. F. Gilberg, Cengage Publication.

Semester 2

Subjects:

Web Technologies

Applied Mathematics – II

Microprocessor and Microcontrollers

DBMS

Digital Communication & Network Standards

CLASS: B. Sc (Information technology)		Semester – II	
SUBJECT: Web Technology			
Periods per week 1 Period is 50 minutes	Lecture	5	
	TW/Tutorial/Practical	3	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	TW/Tutorial/Practical	--	50

Unit – I	<p>Internet and WWW What is Internet?, Introduction to internet and its applications, E-mail, telnet, FTP, e-commerce, video conferencing, e-business. Internet service providers, domain name server, internet address World Wide Web (WWW) World Wide Web and its evolution, uniform resource locator (URL), browsers – internet explorer, netscape navigator, opera, firefox, chrome, mozilla. search engine, web saver – apache, IIS, proxy server, HTTP protocol</p>
Unit- II	<p>HTML and Graphics HTML Tag Reference, Global Attributes, Event Handlers, Document Structure Tags, Formatting Tags, Text Level formatting, Block Level formatting, List Tags, Hyperlink tags, Image and Image maps, Table tags, Form Tags, Frame Tags, Executable content tags</p> <p>Imagemaps What are Imagemaps?, Client-side Imagemaps, Server-side Imagemaps, Using Server-side and Client-side Imagemaps together, Alternative text for Imagemaps,</p> <p>Tables Introduction to HTML tables and their structure, The table tags, Alignment, Aligning Entire Table, Alignment within a row, Alignment within a cell, Attributes, Content Summary, Background Color, Adding a Caption, Setting the width, Adding a border, Spacing within a cell, Spacing between the cells, Spanning multiple rows or columns, Elements that can be placed in a table, Table Sections and column properties, Tables as a design tool</p> <p>Frames Introduction to Frames, Applications, Frames document, The <FRAMESET> tag, Nesting<FRAMESET> tag, Placing content in frames with the <FRAME> tag, Targeting named frames, Creating floating frames, Using Hidden frames,</p> <p>Forms Creating Forms, The <FORM> tag, Named Input fields, The <INPUT> tag, Multiple lines text windows, Drop down and list boxes, Hidden, Text, Text Area, Password, File Upload, Button, Submit, Reset, Radio, Checkbox, Select, Option, Forms and Scripting, Action Buttons, Labelling input files, Grouping related fields, Disabled and read-only fields, Form field event handlers, Passing form data</p> <p>Style Sheets What are style sheets?, Why are style sheets valuable?, Different approaches to style sheets, Using Multiple approaches, Linking to style information in s separate file, ,Setting up style information, Using the <LINK> tag, Embedded style information, ,Using <STYLE> tag, Inline style information</p>
Unit- III	<p>Java Script Introduction, Client-Side JavaScript, Server-Side JavaScript, JavaScript Objects, JavaScript Security, Operators Assignment Operators, Comparison Operators, Arithmetic Operators, % (Modulus), ++(Increment), --(Decrement), -(Unary Negation), Logical Operators, Short-Circuit Evaluation, String Operators, Special Operators, ?: (Conditional operator), , (Comma operator), delete, new, this, void</p> <p>Statements</p>

	<p>Break, comment, continue, delete, do...while, export, for, for...in, function, if...else, import, labelled, return, switch, var, while, with,</p> <p>Core JavaScript (Properties and Methods of Each) Array, Boolean, Date, Function, Math, Number, Object, String, RegExp</p> <p>Document and its associated objects document, Link, Area, Anchor, Image, Applet, Layer</p> <p>Events and Event Handlers General Information about Events, Defining Event Handlers, event, onAbort, onBlur, onChange, onClick, onDblClick, onDragDrop, onError, onFocus, onKeyDown, onKeyPress, onKeyUp, onLoad, onMouseDown, onMouseMove, onMouseOut, onMouseOver, onMouseUp, onMove, onReset, onResize, onSelect, onSubmit, onUnload</p>
Unit – IV	<p>XML Introduction to XML, Anatomy of an XML document, Creating XML Documents, Creating XML DTDs, XML Schemas, XSL</p>
Unit – V	<p>PHP Why PHP and MySQL?, Server-side web scripting, Installing PHP, Adding PHP to HTML, Syntax and Variables, Passing information between pages, Strings, Arrays and Array Functions, Numbers, Basic PHP errors/problems.</p>
Unit – VI	<p>Advanced PHP and MySQL PHP/MySQL Functions, Displaying queries in tables, Building Forms from queries, String and Regular Expressions, Sessions, Cookies and HTTP, Type and Type Conversions, E-Mail</p>

Term Work and tutorial

Should contain minimum 5 assignments and two class tests

Practical: Should contain minimum 8 experiments

List of Practicals:

1. Design a web page using different text formatting tags.
2. Design a web page with links to different pages and allow navigation between pages.
3. Design a web page with Imagemaps.
4. Design a web page with different tables. Design a webpage using table so that the content appears well placed.
5. Design a webpage using frames.
6. Design a web page with a form that uses all types of controls.
7. Design a website using style sheets so that the pages have uniform style.
8. Using Java Script design a web page that prints factorial / Fibonacci series / any given series.
9. Design a form with a test box and a command button. Using Java Script write a program whether the number entered in the text box is a prime number or not.
10. Design a form and validate all the controls placed on the form using Java Script.
11. Design a DTD, corresponding XML document and display it in browser using CSS.
12. Design an XML document and display it in browser using XSL.
13. Design XML Schema and corresponding XML document.
14. Design a php page to process a form.
15. Design a php page for authenticating a user.
16. Design a complete dynamic website with all validations.

CLASS: B. Sc (Information technology)		Semester – II	
SUBJECT: Applied Mathematics – II			
Periods per week 1 Period is 50 minutes	Lecture	5	
	TW/Tutorial/Practical	3	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	TW/Tutorial/Practical	--	50

Unit – I	Complex Numbers: Cartesian, Polar & Exponential form, De-Moivre's theorem, Hyperbolic functions, Logarithms of Complex numbers
Unit- II	Complex Variables : Cauchy Riemann Equations, , Conformal Mapping and Bilinear Mapping, concept of Line Integral, Riemann Integral, Singularities –Poles, Evaluation of Residues theorem.
Unit – III	Laplace Transform: Introduction, Definition, Properties of Laplace Transform, Laplace Transform of standard function. Inverse Laplace Transform: Inverse Laplace Transform , Methods of obtaining Inverse Laplace transform, Laplace transform of Periodic Functions, Heavyside Unit-step Function, Dirac-delta function (Unit Impulse Function), Application of Inverse Laplace transform to solve differential equations.
Unit – IV	Differentiation under Integral sign, Beta and Gamma Functions, Properties and Duplication Formula, Error Functions
Unit – V	Fourier Series: Fourier Series, Change of Interval, Even and odd functions, Half range expansions. Fourier Transform and Inverse Fourier Transform: Fourier transform of Even and Odd functions, Fourier Transform of sine and cosine functions
Unit – VI	Integral Calculus: Double Integral, Area, Triple Integral, Volume

Engineering Mathematics A tutorial approach by R. R. Singh and Mukul Bhatt, TMH 2010

Differential Calculus by Shanti Narayan.

B. S. Grewal, "Higher Engineering Mathematics.

Advanced Engineering Mathematics: R.K.Jain, S.R.K. Iyengar, Narosa Publishing House.

Engineering Mathematics : T Veerajan, Tata McGraw-Hill

Integral Transforms: A. R. Vasishta, Dr. R.K. Gupta, Krishna Prakashan Mandir.

Term Work and Tutorial

Should contain minimum 10 assignments and two class tests

Practical

None

CLASS: B. Sc (Information technology)		Semester – II	
SUBJECT: Microprocessor and Microcontrollers			
Periods per week 1 Period is 50 minutes	Lecture	5	
	TW/Tutorial/Practical	3	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	TW/Tutorial/Practical	--	50

Unit – I	Logic devices: Tristate devices, buffers, encoder, decoder, latches, Types of memories, memory organization, concept of control lines such as read/write chip enable
Unit- II	Introduction to 8085 microprocessor: - Organization of Microprocessor based system, 8085 μ p Architecture, Concept of Address line and Memory interfacing, Address Decoding and Memory Interfacing,
Unit-III	8085 Programming Model, Instruction Classification, Instruction Format, 8085 Instruction Set
Unit- IV	Introduction to Modern day Computer Systems: - Organization and Architecture, Structure and function. System Buses: - Computer Components, Computer function, PCI: - Features of PCI bus, Why PCI bus is needed? Concept of PCI Arbitration. Internal Memory: - Concept of Cache Memory, Methods of Cache Mapping, Concept and need for Cache coherency. External Memory: - RAID.
Unit- V	The 8051 Microcontroller: Introduction and overview of 8051 family, 8051 Assembly Language Programming, Jumps, Loops and call instructions.
Unit-VI	8051 I/O port programming, Addressing Modes, Arithmetic and Logical instructions.

References

William Stallings, “Computer Organisation and Architecture” (4th Edition) - PHI, 1998.
Andrew C. Tanenbaum, “Structured Computer Organisation” (3rd Edition) -, PHI.
Computer System Architecture - M. Morris Memo, PHI, 1998.
John P Hayes, “Computer Architecture and Organisation” - McGraw Hill, 1998.
Digital Computer Fundamentals, Malvino
Microprocessor Architecture and Programming and Applications with the 8085, R.S. Gaonkar, PRI (3rd Edition)
Digital Computer Fundamentals, Thomas C Bartee, TMG
The 8051 Microcontroller and Embedded systems by M. A. Mazidi, J. G. Mazidi and R. D. McKinlay, Pearson Education.

Term Work and tutorial

Tutorial should contain 5 assignments and two class tests

Practical: Should contain minimum 8 experiments (4 from each group)

List of Practicals:

8085 programs for

1. Simple 8-bit and 16-bit addition and subtraction
2. Transfer a block of data from one location to another.
3. Find the largest/smallest of the numbers stored at one location.
4. Addition of 10 numbers.
5. Multiplication of 8-bit and 16-bit numbers.
6. Sorting of numbers.
7. BCD addition
8. Division
9. Find GCD and LCM of two numbers
10. Swapping a block of data

8051 programs for:

1. To search a number from a given set of numbers. The end of the data is indicated by 00.

2. Finding the average of signed numbers.
3. Multiplication of signed numbers.
4. Convert the BCD 0111 0101 number to two binary numbers and transfer this number to registers.
5. To find y where $y = x^2 + 2x + 5$ and x is between 0 and 9.
6. Write a program to show the use of the BIT directive.
7. Write a program to find the number of zeros in register R2
8. Write a program to check if the accumulator is divisible by 8.
9. To check whether a character string is a palindrome or not.
10. To check the number is prime or not.

CLASS: B. Sc (Information technology)		Semester – II	
SUBJECT: DBMS			
Periods per week 1 Period is 50 minutes	Lecture	5	
	TW/Tutorial/Practical	3	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	TW/Tutorial/Practical	--	50

Unit – I	Introduction to Databases and Transactions
	What is database system, purpose of database system, view of data, relational databases, database architecture, transaction management,
Unit- II	Data Models
	The importance of data models, Basic building blocks, Business rules, The evolution of data models, Degrees of data abstraction.
Unit-III	Database Design ,ER-Diagram and Unified Modeling Language
	Database design and ER Model:overview, ER-Model, Constraints, ER-Diagrams, ERD Issues, weak entity sets, Codd’s rules, Relational Schemas, Introduction to UML Relational database model: Logical view of data, keys, integrity rules. Relational Database design: features of good relational database design, atomic domain and Normalization (1NF, 2NF, 3NF, BCNF).
Unit- IV	Relational Algebra and Calculus
	Relational algebra: introduction, Selection and projection, set operations, renaming, Joins, Division, syntax, semantics. Operators, grouping and ungrouping, relational comparison. Calculus: Tuple relational calculus, Domain relational Calculus, calculus vs algebra, computational capabilities.
Unit- V	Constraints, Views and SQL
	What is constraints, types of constrains, Integrity constraints, Views: Introduction to views, data independence, security, updates on views, comparison between tables and views SQL: data definition, aggregate function, Null Values, nested sub queries, Joined relations. Triggers.
Unit-VI	Transaction management and Concurrency control
	Transaction management: ACID properties, serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks),Time stamping methods, optimistic methods, database recovery management.

Books:

A Silberschatz, H Korth, S Sudarshan, “*Database System and Concepts*”, *fifth Edition* McGraw-Hill ,

Rob, Coronel, “*Database Systems*”, *Seventh Edition*, Cengage Learning.

Term Work and tutorial

Should contain 5 assignments and two class tests

Practical: Should contain minimum 8 experiments

Practicals

- 1) Design a Database and create required tables. For e.g. Bank, College Database
- 2) Apply the constraints like Primary Key , Foreign key, NOT NULL to the tables.
- 3) Write a sql statement for implementing ALTER,UPDATE and DELETE
- 4) Write the queries to implement the joins
- 5) Write the query for implementing the following functions:
MAX(),MIN(),AVG(),COUNT()
- 6) Write the query to implement the concept of Intergrity constrains
- 7) Write the query to create the views
- 8) Perform the queries for triggers

- 9) Perform the following operation for demonstrating the insertion , updation and deletion using the referential integrity constraints
 10) Write the query for creating the users and their role.

CLASS: B. Sc (Information technology)		Semester - II	
SUBJECT: Data communication and Network standards			
Periods per week 1 Period is 50 minutes	Lecture	5	
	TW/Tutorial/Practical	3	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	TW/Tutorial/Practical	--	50

Unit-I	Introduction to data communications and networking Introduction, Fundamental concepts, Data communications, Protocol, standards, standard organizations, signal propagation, analog and digital signals, bandwidth of signal and a medium, Fourier analysis and the concept of bandwidth of a signal, The data transmission rate and bandwidth.
Unit-II	Network Models Layered Tasks, The OSI reference model , Layers in the OSI reference model , TCP/IP protocol suite , Addressing IPv4
Unit-III	Information Encoding , Errors Detection and Correction Introduction, Representing different symbols, Minimizing errors , Multimedia , Multimedia and Data compression. Error classification, types of errors, redundancy, detection versus correction , hamming distance , cyclic redundancy check.
Unit-IV	Media and Transmission modes Data and signals, Periodic analog signals, Digital signals, Transmission impairment, Data rate limits, Performance, Digital to digital, Analog to digital conversion , Transmission modes, Digital to analog conversion , Analog to analog conversion, Guided media and Unguided media
Unit-V	Network topologies ,Switching and routing algorithms Mesh,star,tree,ring,bus,hybrid, switching basics , circuit switching, packet switching and Message switching , routing algorithms
Unit-VI	IP version 6 Overview , Terminology, IPv6 addresses , Special addresses , IP v 6 header formats, IPv6 extension headers , IPv6 autoconfiguration , configuration via DHCP v6 , IPv6 transition

Books:

Behrouz A Forouzan, “Data communications and Networking”, Fourth Edition , Mc-Graw Hill
 Achyut Godbole, “Data communications and Networks, TMH
 Dr.Sidnie Feit, “TCP/IP” ,Second Edition, TMH

Reference:

W.Stallings,“Data and Computer Communications”, Eight Edition,Pearson Education

Term Work and Tutorial

Should contain minimum 10 assignments and two class tests. (One case study in lieu of two assignments)

Practical

None

University of Mumbai
B.Sc –IT

1) Issues related to Term work, tutorial, assignments and practicals for FYBSc:

- Marks distribution for subjects having Practical/Tutorials and for the subjects having only Tutorials
- Theory 100 marks per paper, TW/tutorial/practical 50 marks
- Minimum 40% marks out of 100 for passing in theory and 20 marks out of 50 for passing in TW/tutorial/practical.

Semester I

<i>Subject</i>	<i>Theory (100)</i>	<i>Practical / Demo</i>	<i>Tutorial/assignments</i>	<i>Cass tests</i>	<i>Total</i>
P1- Professional Communication skills	<i>Yes (100)</i>	<i>None</i>	<i>Yes (30)</i>	<i>Yes (20)</i>	<i>100+50</i>
P2- Applied Maths – I	<i>Yes (100)</i>	<i>None</i>	<i>Yes (30)</i>	<i>Yes (20)</i>	<i>100+50</i>
P3-Electronics and communication technology*	<i>Yes (100)</i>	<i>Practical (25)</i>	<i>Yes (15)</i>	<i>Yes (10)</i>	<i>100+50</i>
P4- Fundamentals of Digital Computing*	<i>Yes (100)</i>	<i>Practical (25)</i>	<i>Yes (15)</i>	<i>Yes (10)</i>	<i>100+50</i>
P5- Introduction to C++ programming*	<i>Yes (100)</i>	<i>Practical (25)</i>	<i>Yes (15)</i>	<i>Yes (10)</i>	<i>100+50</i>

Semester II

<i>Subject</i>	<i>Theory (100)</i>	<i>Term Work (50)</i>			<i>Total</i>
	<i>Theory (100)</i>	<i>Practical / Demo</i>	<i>Tutorial/assignments</i>	<i>Cass tests</i>	
P1- Web Technology*	<i>Yes (100)</i>	<i>Practical (25)</i>	<i>Yes (15)</i>	<i>Yes (10)</i>	<i>100+50</i>
P2- Applied Maths – II	<i>Yes (100)</i>	<i>None</i>	<i>Yes (30)</i>	<i>Yes (20)</i>	<i>100+50</i>
P3- Microprocessor and Microcontrollers*	<i>Yes (100)</i>	<i>Practical (25)</i>	<i>Yes (15)</i>	<i>Yes (10)</i>	<i>100+50</i>
P4- DBMS*	<i>Yes (100)</i>	<i>Practical (25)</i>	<i>Yes (15)</i>	<i>Yes (10)</i>	<i>100+50</i>
P5- Digital Computer Networks	<i>Yes (100)</i>	<i>None</i>	<i>Yes (30)</i>	<i>Yes (20)</i>	<i>100+50</i>

- *Tutorials are theory/problems to be solved by the students in the classroom at the end of a practical/Theory session.*
- Assignments are theory/problems to be solved by the students at home.
- *Test is conducted in the classroom with due notice. Test could be out of any sum total but is to be converted out of 10 for papers with practicals and out of 20 for papers without practicals as given in table for term work..*
- Semesters I, II, III, IV are college examinations. Question papers will be set by the examiners appointed by the Principal of the affiliated colleges.
- The Principal of the respective colleges is expected to appoint senior faculty as examiners in each subject.
- In respect of I, II, III, IV semesters the assessment will be done by the respective colleges. Moderation and result preparation will be as per existing College / University rules in respect of other similar courses.
- ATKT/Failures examination: After 15 to 20 days from the date of declaration of results of the semester in question.