St. Xavier's College (Autonomous), Mumbai

Syllabus of the courses offered by the Department of Information Technology (2015-16)

Contents:

Theory Syllabus for Courses:

S.ITS.1.01 - Professional Communication Skills

S.ITS.1.02 - Applied Mathematics - I

S.ITS.1.03 - Fundamentals of Digital Computing

S.ITS.1.04 - Electronics and Communication Technology

S.ITS.1.05 - Introduction to C++ Programming

Practical Course Syllabus for: S.ITS.1.PR

F.Y. B.Sc.IT   **Course: S.ITS.1.01**

Title: Professional Communication Skills

Learning Objective:

To equip the students with communication skills required in the Information Technology Industry.

Number of lectures: 75

UNIT 1

The Seven Cs of Effective Communication   **(13 lectures)**

Completeness

Conciseness

Consideration

Concreteness

Clarity

Courtesy

Correctness

UNIT 2

Communication: Its interpretation   **(13 lectures)**

Basics

Nonverbal Communication

Barriers to Communication

UNIT 3

Business Communication at Work Place **(13 lectures)**

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 4

Report writing **(12 lectures)**

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 5

Required Skills **(12 lectures)**

Reading skills

Listening skills

Note-making

Précis writing

Audiovisual aids

Oral communication

UNIT 6

Mechanics of writing   **(12 lectures)**

Transitions

Spelling rules

Hyphenation

Transcribing numbers

Abbreviating technical and non-technical terms

Proof reading

Continuous Internal Assessment

Industrial visits, Group Discussion, presentations / seminars

Mid Term test.

List Of Text Books

1. Professional Communication by ArunaKoneru, McGrawHill.
2. Effective Business Communication by Herta A Murphy, Herbert W Hildebrandt, Jane P Thomas, McGrawHill.

List Of Recommended Reference Books

1. Business Communication, Lesikar and Petit, McGrawHill.
2. Communication Skills Handbook, Summers, Wiley, India.
3. Business Communication (Revised Edition), Rai and Rai, Himalaya Publishing House.
4. Business Correspondence and Report Writing by R. C. Sharma and Krishna Mohan, TMH.

Title: Applied Mathematics - I

Learning Objective:

To study basic mathematics required for developing algorithms for system and application software

Number of lectures: 75

UNIT 1

Matrices   **(13 lectures)**

      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 2

Eigen Values and Eigen Vectors   **(13 lectures)**

      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 3

Vector Calculus   **(13 lectures)**

Vector Differentiation:

      Vector Operator Del

      Gradient and Geometrical Meaning of gradient

      Divergence

      Curl

UNIT 4

Differential Equations   **(12 lectures)**

      Differential Equations of 1st order and 1st degree and applications

UNIT 5

Linear Differential Equations   **(12 lectures)**

      Linear Differential equations with constant coefficient

      Differential equations of higher order and applications

UNIT 6

      Successive differentiation   **(12 lectures)**

      Mean Value theorems

      Partial differentiation

      Euler's Theorem

      Approximation and errors

      Maxima and Minima

Continuous Internal Assessment

      Assignments / Problem solving test

      Mid Term test.

List Of Text Books

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

List Of Recommended Reference Books

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

F.Y. B.Sc.IT   **Course: S.ITS.1.03**

Title: Fundamentals of Digital Computing

Learning Objective:

To study the basic building blocks of any digital electronic machine, for example the hardware of a computer

Number of lectures: 75

UNIT 1

Data and Information   **(12 lectures)**

Features of Digital Systems

Number Systems

       Decimal

       Binary

       Octal

       Hexadecimal and

       Inter conversions

Representation of Data

       Signed Magnitude

       One's complement

       Two's complement

Binary Arithmetic

Fixed point representation and Floating point representation of numbers

Codes

       BCD

       XS-3

       Gray code

       Hamming code

       Alphanumeric codes (ASCII, EBCDIC, UNICODE)

Error detecting and error correcting codes

UNIT 2

Boolean Algebra (12 lectures)

Basic gates (AND, OR, NOT gates)

Universal gates (NAND and NOR gates)

Other gates (XOR, XNOR gates)

Boolean identities

De Morgan Laws.

Karnaugh maps:

SOP and POS forms

QuineMcClusky method.

UNIT 3

Combinational Circuits (12 lectures)

Half adder

Full adder

Code converters

Combinational circuit design

Multiplexers and demultiplexers

Encoders

Decoders

Combinational design using mux and demux.

UNIT 4

Sequential Circuit Design (13 lectures)

Flip flops

RS

Clocked RS

D-Type

JK

JK Master Slave

T-Type

Counters

Shift registers and their types

Counters

Synchronous and Asynchronous counters.

UNIT 5

Computers   **(13 lectures)**

Basic Organisation

Memory

ROM

RAM

PROM

EPROM

EEPROM

Secondary Memory

Hard Disk and optical Disk

Cache Memory

I/O devices

UNIT 6

Operating Systems   **(13 lectures)**

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

Continuous Internal Assessment

Assignments / Project

Mid Term test.

List Of Text Books

1. Modern Digital Electronics by R. P. Jain, 3rd Edition, McGraw Hill
2. Digital Design and Computer Organisation by Dr. N. S. Gill and J. B. Dixit, University Science Press

3. Linux Commands by Bryan Pfaffaenberger BPB Publications

4. UNIX by Sumitabha Das, TMH

List Of Recommended Reference Books

1. Digital Principles and Applications by Malvino and Leach, McGrawHill
2. Introduction to Computers by Peter Norton, McGraw Hill

F.Y. B.Sc.IT   **Course: S.ITS.1.04**

Title: Electronics and Communication Technology

Learning Objective:

To Study electronic devices and circuits which are used in the communication technology and computer hardware.

Number of lectures: 75

UNIT 1

Concept of: **(12 lectures)**

     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 2

Concept of amplification   **(12 lectures)**

     Amplifier notations (Av, Ai, ApZi, Zo)

     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 3

Concept of Feedback   **(12 lectures)**

    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 4

Introduction   **(13 lectures)**

    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 5

FM   **(13 lectures)**

    Definition of FM

    Bandwidth

    Noise triangle

    Per-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 6

Introduction to Digital Communication   **(13 lectures)**

    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

Continuous Internal Assessment

 Assignments / Project

 Mid Term test

List Of Recommended Reference Books

1. Allen Mottershead, "Electronic Devices and Circuits", PHI
2. Boylstead and Neshelesky , "Electronics Devices and Circuits", 4th , PHI, 1999.
3. Simon Haykin, "An Introduction to Analog and Digital communications", John Wiley and Sons, 1994.
4. R.B Carlson, "Communication Systems", MacGraw Hill.
5. George Kennedy, "Electrical Communication systems", Tata McGraw Hill 1993.
6. Roody Collin, "Electronics Communication", PHI
7. J. Millman and A Grabel, " Microelectronics" MacGraw Hill 1988.
8. Proakis J. J, "Digital Communications" McGraw Hill.
9. Digital Communications by TAUB Schilling
10. Electronic Communication Systems, Roy BlakeDelmar, Thompson Learning
11. Introduction To telecommunications, AnuAGokhale, Delmar Thompson Learning

F.Y. B.Sc.IT   **Course: S.ITS.1.05**

Title: Introduction to C++ Programming

Learning Objective:

To learn a programming language and to learn structured and procedural programming concepts.

Number of lectures: 75

UNIT 1

Programming Logic and techniques   **(12 lectures)**

Algorithms

Flow-charts

Program Design

Introduction to C++

     Origin of C++

     A Sample C++ program

     Pitfall and programming tips

Testing and Debugging.

UNIT 2

C++ concepts   **(12 lectures)**

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

Continuous Internal Assessment

UNIT 3

Flow of Control (13 lectures)

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 4

Functions (13 lectures)

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 5

Derived Data types   **(13 lectures)**

Arrays

     Introduction to arrays

     Arrays in functions

     2-D arrays

     Multidimensional arrays

Pointers and Functions

     Introduction to pointers

     void pointers

     Pointers in function

     Pointer to constant and constant pointer

     Generic pointer

UNIT 6

Strings, Vectors and Structures   **(12 lectures)**

String functions

     strcmp

     strcat

     strlen

     strcpy

Vector Basics

Introduction to structures

Continuous Internal Assessment

     Assignments / Project

     Mid Term test.

List Of Text Books

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

List Of Recommended Reference Books

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

F.Y. B.Sc.IT   **Course : S.ITS.1.PR**

Practical – I:

Fundamentals of Digital Computing and

Electronics and Communication Technology

Learning Objective: To understand the working of the fundamental building blocks of a digital computer. To study basic electronics and telecommunication circuits.

Number of lectures: 45

For a 1.5 credit course a minimum of 8 programs should be executed. A journal of the printouts of the programs and its output should be maintained. Certified journal will have to be presented at the time of practical exam.

Digital Computing practicals

I)   Study of logic gates (basic and universal)
II)   Verify De Morgan's theorems
III)   Design and implement Half adder and full adder using gates.
IV)   Design and implement binary to gray code converter and vice versa using XOR gates.
V)   Design and implement multiplier for two 2-bit binary numbers using minimum number of gates.
VI)   Reduce the given numeric form using K-map and implement using gates.
VII)   Implement SOP /POS forms using logic gates.
VIII)   Implement logic gates using multiplexers.
IX)   Implement expressions using multiplexers and demultiplexers
X)   Implement 3-bit binary ripple counter using JK flip flops.

Linux

I)   Installation of Linux
II)   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

Electronics and Telecommunication practicals

   I)   Study of Zener diode characteristics
   II)   Study of Half wave and full wave rectifiers
   III)   Study of bridge rectifier.
   IV)   Study of Transistor as a switch
   V)   Monostablemultivibrator using IC 555 timer.
   VI)   Astablemultivibrator using IC 555 timer.
   VII) Study of Wien bridge oscillator
   VIII) Frequency Response of single stage transistor amplifier
   IX)   Study of Amplitude Modulation
   X)   Study of Frequency Modulation
   XI)   Study of Fibre Optic transmission
   XII) Study of Pulse Amplitude Modulation
   XIII) Study of transistor DC Amplifier

Continuous Internal Assessment

MCQ / Viva test during practicals

Mid Term practical test.

Practical – II:

Introduction to C++ Programming

Learning Objective:

To learn to design an algorithm and a program for a given problem and to actually execute it on a computer.

Number of lectures: 45

For a 1.5 credit course a minimum of 8 programs should be executed. A journal of the printouts of the programs and its output should be maintained. Certified journal will have to be presented at the time of practical exam.

I)   Write a program to Calculate simple and compound interest.
II)   Write a program to Calculate sum of the digits of a number
III)   Write a program to Find the reverse of a number.
IV)   Write a C++ program for Formatting the following statement using setw and endl:
         " Nothing is difficult than beginning"
         "So Let's start the voyage of technology

V)   Write a C++ program for solving the quadratic equation
VI)   Write a C++ program to print all the prime numbers in a given range
VII)   Write a C++ program for displaying the Fibonacci series.
VIII)   Write a C++ program for converting number to words. (switch, break, continue)
IX)   Write a C++ function for swapping two numbers without using third variable.
X)   Write a recursive function for factorial of given number
XI)   Write your own function for string reverse, string palindrome, string comparison
XII)   Write a program for sorting the number in ascending and descending order
XIII)   Write a program for Matrix addition and Transpose.
XIV)   Write a program for Matrix multiplication.
XV)   Write a program for implementing the concept of structures
XVI)   Write a program for finding the greatest and smallest number using vector
XVII)   Write a program for implementing the concept of call by value and call by reference.
XVIII)   Programs on use of pointers

Continuous Internal Assessment

MCQ / Viva test during practicals

Mid Term practical test.

Contents:
Theory Syllabus for Courses:

F.Y. B.Sc.IT   **Course: S.ITS.2.01**
Title: Computer Graphics

Learning Objective:

To understand the logic used in drawing graphs and to implement it through the use of a programming language.

Number of lectures: 75

UNIT 1
Introduction to Computer Graphics   **(13 lectures)**

Introduction and application areas of computer graphics, Video Display Devices,

Raster-Scan Systems,
Random-Scan Systems,
Input Devices, Hard-
Copy Devices.

UNIT 2
Algorithms   **(13 lectures)**

Line-drawing Algorithms-DDA Algorithm,
Bresenham's Line Algorithm,
Circle-Generating Algorithms,

Ellipse Generating Algorithms,
Filled Area Primitives.

UNIT 3
Modeling and Approaches to System Requirements   **(13 lectures)**

Lines Attributes,
Curve Attributes,
Color and Grayscale Levels,

Area-Fill Attributes, Character Attributes,
Bundled Attributes,

Inquiry Functions,
Antialiasing.

UNIT 4
Two Dimensional Geometric Transformation and Viewing   **(12 lectures)**

Basic Transformations, Matrix Representations,
Composite Transformations, other Transformations-Reflection,

Shear, Viewing Pipeline, Window-to-Viewport Coordinate Transformation,
Clipping Operation, Point-Clipping,

Line-Clipping, Polygon Clipping, Curve
Clipping, Text Clipping.

UNIT 5
Three-Dimensional Concepts (12 lectures)

Three-Dimensional Display methods-Parallel
Projection, Perspective Projection, Depth Cueing,
Visible Line and Surface
Identification, Surface Rendering,
Three-Dimensional Object Representations- Bezier Curves and Surfaces,
 B-Spline Curves and Surfaces.

UNIT 6
Visible-Surface Detection Methods (12 lectures)

Classification of Visible-Surface Detection Algorithms,
Back-Face Detection, Depth-Sorting Method, Area-
Subdivision Method, Image and Object Precision, Z-
buffer algorithm, Floating horizons.

Continuous Internal Assessment
Presentation / Developing Games using concepts learnt in CG.
Mid Term test.

List Of Text Books
1. "Computer Graphics", Donald Hearn & M. Pauline Baker, Pearson Education.
2. "Computer Graphics", A. P. Godse, Technical Publications Pune.

List Of Recommended Reference Books
1. Computer Graphics by Hill Jr
2. Computer Graphics, Steven Harrington, McGraw-Hill
3. Computer Graphics Principles and Practise, J.D. Foley, A. Van Dam, S.K. Feiner& R. L. Phillips, Addision Wesley
4. Principles of Interactive Computer Graphics, William M. Newman, Robert F. Sproull, McGraw-Hill.
5. Introduction To Computer Graphics, J.D. Foley, A. Van Dam, S.K. Feiner, J.F. Hughes & R.L. Phillips, Addision Wesley
6. Computer Graphics by Rogers.

F.Y. B.Sc.IT   Course: S.ITS.2.02

Title: Applied Mathematics II

Learning Objective:
To study advanced mathematical concepts used in software development of Computer Graphics, animation, image processing, cryptography, etc.

Number of lectures: 75

UNIT 1
Complex Numbers: (13 lectures)
Cartesian,
Polar & Exponential form,
De-Moivre's theorem,
Hyperbolic functions,
Logarithms of Complex numbers

UNIT 2
Complex Variables :   **(13 lectures)**
Cauchy Riemann Equations,
Conformal Mapping and Bilinear Mapping,
concept of Line Integral,
Riemann Integral,
Singularities –Poles, Evaluation of Residues theorem.
UNIT 3
Laplace Transform   **(13 lectures)**
  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 4
Differentiation under Integral sign,   **(12 lectures)**
Beta and Gamma Functions,
Properties and Duplication Formula,
Error Functions
UNIT 5
Fourier Series   **(12 lectures)**
  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
  Files

UNIT 6
Integral Calculus   **(12 lectures)**
  Double Integral,
  Area,
  Triple Integral,
  Volume

Continuous Internal Assessment
Assignments / Problem solving test
Mid Term test.

List Of Text Books

1. Engineering Mathematics A tutorial approach by R. R. Singh and Mukul Bhatt, TMH
2. Differential Calculus by Shanti Narayan.
3. B. S. Grewal, "Higher Engineering Mathematics.
4. Advanced Engineering Mathematics: R.K.Jain, S.R.K. Iyengar, Narosa Publishing House.
5. Engineering Mathematics : T Veerajan, Tata McGraw-Hill
6. Integral Transforms: A. R. Vasishta, Dr. R.K. Gupta, KrishnaPrakashanMandir

F.Y. B.Sc.IT   **Course: S.ITS.2.03**

Title: Microprocessor and Microcontrollers

Learning Objective:
To understand the architecture and functioning of a microprocessor and a microcontroller which are the prototypes of the modern large computers.

Number of lectures: 75

UNIT 1
Logic devices   **(13 lectures)**
Tristate devices,
buffers, encoder,
decoder, latches,
Types of memories,
memory organization,
concept of control lines such as read/write chip enable
UNIT 2
Introduction to 8085 microprocessor   **(13 lectures)**
Organization of Microprocessor based system,
8085 µp Architecture,
Concept of Address line and Memory Interfacing,
Address Decoding and Memory Interfacing,
UNIT 3
8085 Programming Model   **(13 lectures)**
Instruction Classification,
Instruction Format,
8085 Instruction Set
UNIT 4
Introduction to Modern day Computer Systems   **(12 lectures)**
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 5
The 8051 Microcontroller   **(12 lectures)**

Introduction and overview of 8051 family,
8051 Assembly Language Programming,
Jumps,
Loops and call instructions.

UNIT 6
Interfacing the 8051 Microcontroller   **(12 lectures)**
8051 I/O port programming,
Addressing Modes,
Arithmetic and Logical instructions

Continuous Internal Assessment
Assignments / Project
Mid Term test

List Of Text Books

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

F.Y. B.Sc.IT   **Course: S.ITS.2.04**

Title: Data Base Management Systems (DBMS)

Learning Objective:
To learn the concept of database systems and software techniques for manipulating
and maintaining databases.

Number of lectures: 75

UNIT 1
Introduction to Databases and Transactions   **(13 lectures)**
What is database system,
purpose of database system,
view of data, relational databases,
database architecture, transaction management
UNIT 2
Data Models   **(13 lectures)**
The importance of data models,
Basic building blocks, Business rules,
The evolution of data models,
Degrees of data abstraction.

UNIT 3
Database Design,ER-Diagram and Unified Modeling Language   **(13 lectures)**
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 4
Relational Algebra and Calculus   **(12 lectures)**
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 5
Constraints, Views and SQL   **(12 lectures)**
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 6
Transaction management and Concurrency control (12 lectures) Transaction management:

ACID properties,

serializability and concurrency control,

Lock based concurrency control (2PL, Deadlocks),

Time stamping methods, optimistic methods,

Database recovery management

Continuous Internal Assessment

Assignments / Project

Mid Term test.

List Of Text Books

1. A Silberschatz, H Korth, S Sudarshan, "*Database System and Concepts*", *fifth Edition* McGraw-Hill,

2. Rob, Coronel, "*Database Systems*", *Seventh Edition*, Cengage Learning

F.Y. B.Sc.IT   **Course: S.ITS.2.05**

Title: Data Communication and network standards

Learning Objective:
To study the process of networking computers and to study the data transfer process from one computer to another using networks.

Number of lectures: 75

<u>**UNIT 1**</u>
Introduction to data communications and networking   **(13 lectures)**
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.
<u>**UNIT 2**</u>
Network Models   **(13 lectures)**
Layered Tasks, The OSI reference model,
Layers in the OSI reference model,
TCP/IP protocol suite , Addressing IPv4
<u>**UNIT 3**</u>
Information Encoding, Errors Detection and Correction   **(13 lectures)**
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
<u>**UNIT 4**</u>
Media and Transmission modes   **(12 lectures)**
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
<u>**UNIT 5**</u>
Network topologies ,Switching and routing algorithms   **(12 lectures)**
Mesh,star,tree,ring,bus,hybrid,
switching basics, circuit switching,
packet switching and Message switching,
routing algorithms.
<u>**UNIT 6**</u>
IP version 6   **(12 lectures)**
Overview, Terminology, IPv6 addresses,
Special addresses , IP v 6 header formats,
IPv6 extension headers, IPv6 auto configuration,
configuration via DHCP v6 , IPv6 transition

Continuous Internal Assessment
Assignments / Project
Mid Term test

List Of Text Books

1. Behrouz A Forouzan, *"Data communications and Networking"*, Fourth Edition, Mc-Graw Hill
2. AchyutGodbole, "Data communications and Networks, TMH
3. Dr.SidnieFeit, "TCP/IP" ,Second Edition, TMH

List Of Recommended Reference Books

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

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F.Y. B.Sc.IT   **Course : S.ITS.2.PR**

Practical I:

COMPUTER GRAPHICS
MICROPROCESSOR AND MICROCONTROLLERS

Number of lectures: 45

COMPUTER GRAPHICS

Learning Objective: To develop a program to implement following algorithms

For 1st part of the course (1.5 credits) a minimum of 8 programs should be executed. A journal of the printouts of the programs and its output should be maintained. Certified journal will have to be presented at the time of practical exam.

Modern Operating System practical list

I)   Write a program to implement the DDA Algorithm.
II)   Write a program to implement the Bresenham's Algorithm.
III)   Write a program to implement the Mid-point Circle Algorithm.
IV)   Write a program to implement the Ellipse Algorithm.
V)   Write a program to implement the Pie-Algorithm.
VI)   Write a program to design any given pattern.
VII)   Write a program to implement the 2D Translation Concept.
VIII) Write a program to implement Translation Concept.
IX)   Write a program to implement Scaling Concept.
X)   Write a program to implement Reflection Concept.
XI)   Write a program to implement the Cohen-Sutherland Line Clipping Concept.
XII)   Write a program to implement the Bezier Curve

MICROPROCESSOR AND MICROCONTROLLERS

Learning Objective:
To be able to develop and execute assembly language programs for microprocessors and microcontrollers.

8085 programs:

I) Simple 8-bit and 16-bit addition and subtraction
II) Transfer a block of data from one location to another.
III) Find the largest/smallest of the numbers stored at one location. IV) Addition of 10 numbers.
V) Multiplication of 8-bit and 16-bit numbers.
VI) BCD addition

8051 programs:

I) To search a number from a given set of numbers. The end of the data is indicated by 00.
II) Finding the average of signed numbers.
III) Multiplication of signed numbers.
IV) Convert the BCD 0111 0101 number to two binary numbers and transfer this number to registers.

Continuous Internal Assessment

MCQ / Viva test during
practicals Mid Term practical
test.

Practical II:
DATA BASE MANAGEMENT SYSTEMS (DBMS)

Number of lectures: 45

Learning Objective: To be able to design and develop a dynamic database system and design queries to extract information and update and modify the data base.
For a 1.5 credit course a minimum of 8 programs should be executed. A journal of the printouts of the programs and its output should be maintained. Certified journal will have to be presented at the time of practical exam.

DBMS practical list

I) **Design a Database and create required tables.**
   a. For e.g. Bank, College Database to create simple tables , with only the primary key constraint (as a table level constraint)
   b. Include at least 8 data types and note down the characteristic of each in the journal.
   c. Include the datetime data type and set the current system date as default.
II) **To create more than one table by applying following constraints to the tables:**
   a. the referential integrity constraint (Foreign key),
   b. NOT NULL constraint and
   c. Primary Key constraint.
III) **To create one or more tables with following constraints:**
   a. PK & FK
   b. Check constraint
   c. Unique constraint
   d. Not null constraint
IV) **Write SQL statements for implementing :**
   a. ALTER schema of a table in a database,
   b. Auto Increment
   c. DROP
V) **Using tables created in previous practicals, write SQL statements for executing:**
   a. Insertion of records
   b. Update statement on records

      c. Deletion of records

VI) **Query the tables using simple form of select statement**
- a. Select <field-list>
    from table

        [where <condition>

        order by <field list>]

- b. Select <field-list, aggregate functions >
    from table

        [where <condition>

           group by<>

           having <>

           order by <>]

    Aggregate functions that must be used should include:
    MAX(),MIN(),AVG(),COUNT()

VII) **Query an existing table, using set operations**
- a. union,
- b. intersect

VIII) **Write the queries to implement the following joins:**
- a. Explicit and implicit Inner joins
- b. Right outer join
- c. Left outer join
- d. Full outer join
- e. Nested joins

IX) **Query tables, using nested queries and make use of following clauses:**
- a. 'Except' clause,
- b. Exists clause,
- c. not exists clause

X) **Views**
- a. Create a view using the following: With schema binding/ With encryption/ With check constraint
- b. Create nested views.
- c. Delete a view

XI) Normalize the table given by your instructor, get it checked with signature, and convert those tables into tables with required constraints. Insert records to the same. Perform the required queries as directed by the instructor.

XII) Write the query for creating the users and their role.

XIII) Microsoft Access:
- a. Introduction to Microsoft Access, database and table creation
- b. Introduction to Form design:
    - i. Creating a Form that acts as a front end to the access table.
- c. Executing queries on the tables using SQL/SQL wizard

Contents:

Theory Syllabus for Courses:

S.ITS.3.01 - Logic and Discrete Mathematical Structures (LDMS)

S.ITS.3.02 - Web Designing And Programming

S.ITS.3.03 - Advanced Structured Query Language (ASQL)

S.ITS.3.04 - Object Oriented Programming with Java S.ITS.3.05 - Embedded System

Practical Course Syllabus for: S.ITS.3.PR

S.Y. B.Sc.IT   **Course: S.ITS.3.01**

Title: Logic and Discrete Mathematical Structures (LDMS)

Learning Objective:

To develop logical reasoning and analytical mind

Number of lectures: 75

UNIT 1

Fundamentals and Logic   **(10 lectures)**

Sets and subsets

Operations on sets

Sequences mathematical structures

The inclusion exclusion principle

Mathematical induction

Logic – propositions and logical operations

Conditional statements

Methods of proof

UNIT 2

Counting Principles (10 lectures)

Permutations

Combinations

The pigeon hole principle

Recurrence relation

Elements of probability

UNIT 3

Relations and Digraphs (10 lectures)

Relations and digraphs

Paths in relation and digraphs

Properties of relation

Equivalence relations

Computer representation of relations and digraphs

Transitive closure and Warshalls algorithm.

UNIT 4

Functions, Graph theory and Trees (15 lectures)

Functions for computer science

Permutations functions

Growth of functions

Graph

Eulers paths and circuits

Hamiltonion paths and circuits

Trees

Labeled trees

Tree searching

minimal spanning trees

UNIT 5

Order relations and Structures (15 lectures)

Partially ordered sets

Lattices

Finite Boolean algebra

Functions on Boolean algebra

Semi groups

Groups

 Coding of binary information and error detection

Decoding and error correction

UNIT 6

Languages and Finite state machines   **(15 lectures)**

Languages

Representation of special languages and grammars

Finite state machines

Machines and regular languages

Continuous Internal Assessment

Problem solving / MCQ

Midterm test

List Of Text Books

Discrete structures by B Kolman RC Busby, S Ross Pvt.ltd

List Of Recommended Reference Books

1. Discrete structures by Liu
2. Discrete mathematics for computerscientists and mathematicians ---Joe L Mott
3. Discrete mathematics, schaum's outline series --- Seymour Lipschutz , Marc Lipson.

S.Y. B.Sc.IT   **Course: S.ITS.3.02**

Title: Web Designing and Programming

Learning Objective:

To learn Web page designing and programming using JavaScript, jQuery, HTML, CSS, XML, PHP technologies for the WWW.

Number of lectures: 75

UNIT 1

Internet and WWW (10 lectures)

What is Internet?

Introduction to internet and its applications

E-mail, telnet, FTP, ecommerce, video conferencing, e-business Internet service providers

Domain name
Server

Internet address
World Wide Web (WWW)

World Wide Web and its evolution

Exploring the Uniform resource locator (URL) and its components

Page **3** of **18**

Browsers

Google Chrome, Mozilla Firefox, Opera,

Apple Safari, Internet Explorer 9

Search engine

Web server

Apache, IIS, proxy server, xampp, HTTP protocol method

UNIT 2

HTML and Graphics   (15 lectures)

HTML Tag Reference, Global Attributes,
Document Structure Tags, Formatting Tags,
Text Level formatting,Understanding the
difference between a tag, element and
attributes in HTML

Organizing Text in HTML

Preformatted Text, DIV Element, SPAN Element

Creating Lists (Definition, Unordered and Ordered)

Imagemaps

What are Imagemaps?

Client-side Imagemaps, Server-side Imagemaps,

Using Serverside and Client-side Imagemaps together,

Alternative text for Imagemaps,

Hyperlink tags

Exploring the Hyperlinks, href attribute, target attribute (_blank, _parent, _self, _top)
and id attribute, Images and text as hyperlinks,

Tables

Understanding Tables, Describing the TABLE Element,

CAPTION, COLGROUP, COL, TBODY, THEAD,

TFOOT, TR, TD, TH, Spanning Rows and Columns,

Placing images and text in a table, Nested Tables

Frameset and iframe

Introduction to Frames, Applications,

The <FRAMESET> tag, Nesting<FRAMESET> tag,
Placing content in frames with the <FRAME> tag,
Targeting named frames,iframes

Forms

Creating Forms using <FORM> tag and its attributes,

The <INPUT> tag, Single and Multiple lines text fields,

Password Field, Radio Button, Checkboxes, Submit button,

Select element, Hidden Text, Text Area, File Upload,

Button, Label, fieldset, legend, Option, Optgroup,

Disabled and read-only fields, Form field event handlers,

Passing form data

HTML5 new elements

Canvas for 2D drawing, video, audio,
Content specific elements: article,
footer, header, nav, section, wbr,
datalist, output Form controls:
Calendar, date, time, email, url,
search

Style Sheets using CSS3

Evolution of CSS, Understanding the CSS Syntax, Exploring CSS Selectors (universal, type, class, id, child, descendant, adjacent sibling), Inserting CSS in an HTML document: The Internal Style Sheet

The External Style Sheet
The Inline Style Sheet

Defining Inheritance in CSS

Backgrounds and Color Gradients, Fonts and Text Styles,
Creating Boxes and Columns, Displaying, Positioning,
Floating an Element, List Styles, Table Layouts Pseudo-
classes and Pseudo-elements

UNIT 3

Java Script & jQuery (15 lectures) Introduction

Client-Side JavaScript, Server-Side JavaScript,

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

Statements

Break, comment, continue, delete, function, return, switch, var

Core JavaScript (Properties and Methods of Each)

Array, Boolean, Date, Function, Math,

Number, Object, String, regExp

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

jQuery

Fundamentals of jQuery, Loading and using jQuery, jQuery Syntax, jQuery Selectors, Element properties and attributes,

Methods to access HTML Attributes, Methods for Traversing, jQuery Events, CSS using jQuery

UNIT 4

XML   **(10 lectures)**

Introduction to XML

Anatomy of an XML document
Creating XML Documents

Creating XML DTDs, XML Schemas, XSL

UNIT 5

PHP   **(12 lectures)**

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

UNIT 6

Advanced PHP and MySQL **(13 lectures)**

> PHP/MySQL Functions, Displaying queries in tables,
>
> Building Forms from queries,
>
> PHP/MySQL Efficiency, PHP/MySQL Problems,
>
> Advanced Array Functions,
>
> String and Regular Expressions,
>
> File System and System Functions,
>
> Sessions, Cookies and HTTP,
>
> Type and Type Conversions, PHP Mathematics,
>
> E-Mail

Steps to deploy a website

Continuous Internal Assessment

> Assignments / Project
>
> Mid Term test.

List Of Text Books

1. Web Design The Complete Reference by Thomas Powell, Tata McGraw Hill
2. HTML5 covers CSS3, JavaScript, XML, PHP, jQuery Black Book, dreamtech press
3. HTML and XHTML The Complete Reference by Thomas Powell, Tata McGraw Hill
4. JavaScript: A Beginners guide by John Pullock, Tata McGraw Hill
5. jQuery in Action second edition by Bear Bibeault and Yehuda Katz, dreamtech press
6. XML: The Complete Reference by Williamson, Tata McGraw Hill
7. Beginning PHP and MySQL by W. J. Gilmore, Apress
8. http://www.w3schools.com/browsers/

List of Recommended Reference Books

1. HTML for the WWW with XHTML and CSS: Visual Quickstart Guide 5th Edition, Pearson Education.

2. Programming the Web using HTML and JavaScript by Larry Randles Lagerstrom, TataMcGraw Hill

3. JavaScript Step by Step by Suehring, PHI
4. XML: A beginners guide by StevenHolzner Tata McGraw Hill
5. PHP: A beginners guide by VikramVaswani, Tata McGraw Hill
6. PHP: The Complete Reference by Steven Holzner, Tata

S.ITS.3.02 Assignment Guidelines

☐ Topics have to be one step beyond the syllabus, For example: An assignment on Java script could include an in depth study on JavaScript Frameworks like Backbonejs, EmberJS, AngularJS rather than just JQuery.

☐ Develop thoughts logically.

☐ Do not merely repeat the author's position and content—evaluate the author's position from your own point of view and experiments.

☐ You are encouraged to both agree and disagree with the authors of course materials. Explain why you agree or disagree.

☐ Write at a college level, using appropriate vocabulary, grammar, and spelling. Avoid using the second person (you). Avoid generalizations, idioms, and slang.

☐ Consult reference works, including standard dictionaries, to accurately define terms.

☐ Express concepts in your own words as much as possible. Document all quotations, paraphrases, and important ideas that are not your own, even if they are from course materials.

☐ Clearly identify UID, Roll no and assignment topic on a title page.
☐ Reference list must not include Google and Wikipedia

☐ Assignment submission must be accompanied with its corresponding plagiarism report. (viper or turnitin websites may be used)

S.Y. B.Sc.IT   **Course: S.ITS.3.03**

Title: Advanced Structured Query Language (ASQL)

Learning Objective:

To develop the skill of data base programming using advanced concepts.

Number of lectures: 75

Unit 1   (12 lectures)

Writing Basic SQL Select Statements,

Restricting and Sorting Data, Single-Row Functions,

Joins (Displaying Data from Multiple Tables),

Aggregating Data using Group Functions, Manipulating Data,

Creating and Managing Tables, Including Constraints,

Creating Views, inline views,

Controlling User Access, grant, revoke, rollback.

Creating Other Database Objects (Sequences, Indexes and Synonyms)

Unit 2   (10 lectures)

Group by clause advanced concepts:

Using SET operators, Enhancements to Group by clause,

cube, Rollup and Grouping.

Advanced Sub queries:

Multiple column sub queries,

Sub queries in FROM clause,

IN,ALL.ANY ,EXISTS operators,

Scalar and correlated sub queries

Unit 3   (13 lectures)

Procedure language :

Types of PL/SQL blocks,

Identifiers, types of Identifiers,

Declarative Section, variables,

Scalar Data Types, The %TYPE Attribute,

Bind Variables, Sequences in PL/SQL Expressions,

Executable Statements, PL/SQL Block Syntax,

Deployment of SQL Functions in PL/SQL,

Nested Blocks, Operators.

Control Structures:

Conditional processing using IF Statements and CASE Statements, Loop Statement, While Loop Statement, For Loop Statement, the Continue Statement, Composite Data Types Exception Handling, Handle Exceptions with PL/SQL, Trap Predefined and non-predefined Oracle Server Errors, User-Defined Exceptions, Propagate Exceptions, RAISE_APPLICATION_ERROR Procedure,

Unit 4 (13 lectures) Stored Procedures:

What is procedure? Syntax of crating procedure,
Creating procedure with parameters, IN parameter,
OUT parameter, methods of passing parameter,
Invoking procedure from other procedure,

The PL/SQL Execution Environment,

Differences between Anonymous Blocks and Subprograms, Declaring subprograms, Handled exceptions, removing procedures

Functions:

Basic concept of functions, different types of functions,
Advantages of using Stored Functions,the steps to create a
stored function,

Invoke User-Defined Functions in SQL Statements,
Restrictions when calling Functions,

Control side effects when calling Functions,

View Functions Information, Functions and Procedures,

Unit 5   (12 lectures)

Packages:

overview of packages, components of packages,

referencing package objects, developing a package, creating package specification, declaring public constructs,

creating package body , public and private   constructs,

removing packages, advantages of packages.

Overloading using forward declarations,

user defined package,

invoking user defined package from a SQL statement.

Large Objects:

    objectives, LOB, anatomy of LOB,

    contrasting Long and Lob Data types,

    adding LOB columns to a table,

    populating LOB columns removing
    LOB,

    BFILE, loading BFILE,

Unit 6   (15 lectures)

Dynamic SQL:

Cursor:

    objectives, explicit cursor functions,
    declaring the cursor, opening the cursor,

    fetching data from the cursor, closing the cursor,
    explicit cursor attributes, the %ISOPEN
    attribute, cursor FOR loops

Triggers:

    Definition, the Trigger Event Types and Body,

    Business Application Scenarios for Implementing Triggers,

    Create DML Triggers using the CREATE TRIGGER Statement and SQL Developer,
    Body, and Firing (Timing),

    Statement Level Triggers and Row Level Triggers,
    Creating Compound, DDL and Event Database
    Triggers, Compound Trigger Structure for Tables and
    Views, instead of trigger, DDL trigger.

    Comparison of Database Triggers and Stored Procedures,

List Of Text Books

1.Murach's Oracle SQL and PLSQLby Joel Murach, Murach and Associates.

2.Oracle Database 11g PL/SQL Programming Workbook By: Michael Mc Laughlin,John Harper

List of Recommended Reference Books

1.Oracle PL/SQL Programming Fifth Edition By Steven Feuerstein, Bill Pribyl 2.Oracle 11g: SQL Reference Oracle press

Term Work:

Assignments/Tests

S.Y. B.Sc.IT   **Course: S.ITS.3.04**

Title: Object Oriented Programming with Java

Learning Objective:

To learn a Core Java fundamentals, To understand how java is used in object oriented programming. To develop strong foundation for building projects in java. To understand how Java differs from other programming languages.

Design Patterns skill is useful in designing projects.

Number of lectures: 75

Unit 1   **(10 lectures)**

Overview of Java

       Difference between C++ and java

       Architecture of java --portablility

       Features of java , Data types in java

       Variables in java, Scope and lifetime of variables

       Arrays in java- 1D, 2D, Different ways to declare an array.

Arithmetic operators, Boolean operators, Assignment operator, ? operator

Control statements –while, do-while, for, if-else, switch

Unit 2 (10 lectures) Classes , Methods and Object Oriented Features

Class fundamentals, Objects,

Assigning Object Reference Variables, Methods,
Passing parameter to method, Constructors,

this and super keyword, garbage collection.,
Inheritance, Polymorphism,

String, StringBuffer, StringTokenizer,
Wrapper Classes

Unit 3

Interface and Packages   **(10 lectures)**

Packages, Access Protection,

Importing Packages, Interface

Defining a Package, Finding Packages and CLASSPATH
A Short Package Example, Access Protection,

An Access Example, Importing Packages,
Interfaces, Defining an Interface
implementing Interfaces, Nested Interfaces,
Applying Interfaces, Variables in
Interfaces, Interfaces Can Be Extended

Unit 4 (15 lectures) Exceptional Handling, JDBC and Thread

Exceptional Handling fundamentals,
Exception Types Uncaught Exceptions,
try and catch, multiple catch clauses,
nested try statements, throw, throws
finally, java built in exception,

creating your own exception subclasses

Understanding Type I driver of JDBC, Examples using JDBC ,

Understanding ResultSetMetaData, PreparedStatement, CallableStatement interface

Java thread model, main thread , creating a thread, creating

multiple threads, using isAlive(), join(), Thread priorities, synchronization, interthread communication

Unit 5 (15 lectures)

Collection Framework and Design Pattern

Collections Overview

The Collection Interface -List Interface, Set Interface

The Collection Classes-

ArrayList class,

Linked List class,

Vectors and Hashtable

Design Pattern

Singleton Pattern, Adapter Pattern, Façade Pattern

Factory Pattern, Proxy Pattern

Unit 6. (15 lectures)

I/O , Applets and Swing

I/O basics, Reading console inputs, writing console output, PrintWriter class

Reading and writing files.

Applet fundamentals, Life cycle of Applet, Programs using applets,

Introduction to swing. Difference between swing and Applet.

JLabel and ImageIcon ,JTextField ,JButton, JToggleButton

Check Boxes ,Radio Buttons, JTabbedPane, JScrollPane, JList

JComboBox, Trees, JTable and event handling

Continuous Internal Assessment

Assignments / Project

Mid Term test.

List of Text Books:

1. Java 2 Complete Reference by Herbert Schildt .   --TMH Publication
2. Design pattern in Java—steven john metsker -- Pearson publication

List of Recommended Reference Books

1 OCJP—by Kathy Sierra
.

2 Java2 by Ivan Bayross --bpb publication
.

3 Java2 by Balaguruswamy --TMH
.

S.Y. B.Sc.IT   **Course: S.ITS.3.05**

Title: Embedded System

LEARNING OBJECTIVE:

To learn the importance of Embedded System. Write programs for embedded system

[Total Lectures 75]

Unit 1. Introduction [13]

Review of 8051 microcontroller.

Introduction to embedded system?

Variations on the theme,

C : The least common denominator ,

Introduction about hardware

Unit 2. Real Time Operating System [13]

OS Services

– Interrupt Routines Handling

– Task Scheduling Models

– Handling of Task Scheduling and Latency and Deadlines as Performance Metrics

Unit 3. Inter Process Communication and Synchronization. [12]

Shared Data Problem

Use of Semaphore(s)

Priority Inversion Problem and Deadlock Situations

Inter Process Communications using Signals

Semaphore Flag or Mutex as Resource key

Message Queues

Unit 4. Embedded Programming [13]

Compiling, linking and locating, the Build Process.

Writing Embedded C Programs

Difference between programs and embedded programs

Unit 5. Memory [12]

Types of memory,

Memory testing,

Validating memory contents,

Working with Flash Memory

Unit 6. Peripherals **[12]**

Control and status Registers,

The device driver philosophy,

Timers and Timer Drivers in Embedded Systems.

Continuous Internal Assessment

Assignments / Project

Mid Term test.

List Of Text Books

1. Programming Embedded systems in C and C++, O.reilly
2. http://www.ece.cmu.edu/~koopman/iccd96/iccd96.html

List Of Recommended Reference Books

1. Rajkamal, ―Embedded Systems Architecture, Programming and Design‖, Tata McGraw Hill.

2. Shibu K., Introduction to Embedded Systems

S.Y. B.Sc.IT **Course : S.ITS.3.PR**

Practical – I:

ASQL

EMBEDDED SYSTEM

Number of lectures: 90

ADVANCED SQL

Learning Objective: To develop database using advanced SQL concepts.

For a 1.5 credit course a minimum of 8 programs should be executed. A journal of the printouts of the programs and its output should be maintained. Certified journal will have to be presented at the time of practical exam.

Advanced SQL practicals

I) Select queries and joins
  a. Select queries on single table using alias, where and order by clause.
  b. Select queries on single table using aggregate functions and group by clause.
  c. Querying data from multiple Tables using ROLLUP ,CUBE operators.
II) ISub queries, DML and DDL
  a. Querying single and multiple tables using sub queries.

  b. Manipulating data (Insert, update and delete)
  c. Creating simple tables and tables with constraints.
III) Creating database objects,
  Controlling user access and using set operators

  a. Creating Views, Sequences, Indexes and synonyms.
  b. Granting and revoking privileges on user objects.

IV) Working with advanced sub queries

  a. Multiple column sub queries, sub queries in from clause,
  b. Scalar sub queries and correlated sub queries,
  c. correlated sub query
V) Basic PL/SQL,
  a. Creating anonymous PL/SQL blocks.
  b. manipulating data using PL SQL

  c. Process a number of rows from a table and populate another table with the results using a cursor FOR loop.

VI) Cursors, Exceptions and procedures issuing DML and query commands.

  a. Cursors with parameters to process a number of rows from multiple tables.
  b. Create exception handlers for specific situations.
  c. Create procedures that issue DML and query commands.
VII) Functions and Stored Procedures

  a. Creating and invoking functions from SQL statements.

  b. Creating and invoking stored procedures.
  c. Create inbuilt functions using Cursor.
VIII)   Working with packages

  a. Create package specifications and package bodies. Invoke the constructs in the packages.

  b. Create a package containing an overloaded function.
  c. Implementation of LOB data type..

IX) Working with triggers

    a. create a trigger to update a table only during office timing.
    b. Create row triggers for updating values.
    c. Create procedures that will be invoked from the triggers.

X) Working with INSTEAD OF triggers, business rules and recompiling procedures, functions, packages and views.

    a. Create instead of triggers for views.
    b. Implement business rules.
    C create trigger for automatic updating tables..

EMBEDDED SYSTEM

Learning Objective:

To learn to program using assembly language / embedded C, Arduino and Microcontroller Kits.

Any three from the each of the following categories should be implemented

Using Simulator

1. Write a program to flash single LED at P1 from right-to-left and left-to-right.
2. Write a program to search a number from given set of numbers
3. Add two numbers stored in R0 and R1. If the sum is greater than FF,
    port   p1.0 will be ─ON‖.

4. Add four numbers stored in RAM location 40 to 43 display the result in binary
    at port0(MSB) and port1 (LSB).

5. Write a program to toggle all the bits of P1 continuously after every 1s. Use
    Timer0, mode 1 (16 bit timer/counter) to create the delay.

    ☐ Using polling method
    ☐ Using interrupt driven method

Using Arduino Kit

1. Programming using LED.
2. Programming using LDR

3. Programming using LCD
4. Programming using REMOTE CONTROL
5. Programming using the serial command prompt as display and the remote control.

Using Microcontroller Kit.

1. Configure timer control registers of 8051 and develop a program to generate given time delay.

2. Port I/O: Use one of the four ports of 8051 for O/P interface to eight LED's.

   Simulate binary counter (8-bit) on LED's.

3. 8051 with D/A converter and generate square wave of given frequency o le a oscilloscope.

4. Interface stepper motor with 8051 and write a program to move the motor through a given angle in clockwise or counter clock wise direction.

5. Generate traffic signal

**A journal of the printouts of the programs and its output should be maintained.
Certified journal will have to be presented at the time of practical exam.**

Continuous Internal Assessment

MCQ / Viva test during practicals

Mid Term practical test.

S.Y. B.Sc.IT   **Course : S.ITS.3.PR**

Practical – II:

OOP with JAVA

WEB DESIGNING AND PROGRAMMING

Number of lectures: 90

For a 1.5 credit course a minimum of 8 programs should be executed. A journal of the printouts of the programs and its output should be maintained. Certified journal will have to be presented at the time of practical exam.

OOP with JAVA

Learning Objective: To apply the concepts learnt in object oriented programming using java.

Number of lectures: 45

Minimum 8 programs should be implemented.

I) Design a program to implement concept of class, constructor and inheritance
 Design a class to represent a bank account to display name and balance using

   Members:

   b. Account name
   c. Depositor name
   d. Type of account
   e. Balance amount in account

   Methods:

   a. to assign initial value
   b. to deposit an amount
   c. to withdraw an amount after checking balance

II) Write a program to Calculate sum of the digits of a number

III) Create a login screen and authenticate the user by matching username and password through database

IV) Write java code to design four radio buttons and whenever user clicks on a particular button the selected button should be known by text message . Implement the Listener

V) Design the screen using swing to accept the roll number and marks in three subjects and on click of the button it shows the average of marks on the text

VI) Write a program for exception handling. Implement user-defined exception. Create, throw and catch user – defined exception and handle runtime exception

VII)   Write java program to find whether the string is a palindrome or not

VIII)   Write java program for arranging the strings in alphabetical order

IX) Write java program to arrange the numbers in decreasing order but the numbers should be stored using Vector

X) Write a java program to read data from a file and copy it to another file.

A journal of the printouts of the programs and its output should be maintained. Certified journal will have to be presented at the time of practical exam.

WEB DESIGNING AND PROGRAMMING

Learning Objective:

To be able to design and develop a dynamic website.

Number of lectures: 45

For a 1.5 credit course a minimum of 8 programs should be executed. A journal of the printouts of the programs and its output should be maintained. Certified journal will have to be presented at the time of practical exam.

I)   Design a web page using a text editor with different text formatting tags and save it as *aboutme .html* extension in a folder called *Prac_1* in the D - drive.

II)   **Lists, Links & Images:**

Design a HOME page called *index.html* with links to different pages and allow navigation between pages. **Elements:** your page must use some lists (numbered and/or un-numbered and/or description), as well as a table, and a variety of headings. The page must also include some images and some links to other websites like ww.xaviers.edu. The web page title must reflect what the page is: example ―John White's Home Page‖

Make the top level heading of the web page the same as the title. **Content:** the page should comprise of your personal information like

Academic/Employment status: I am a student Courses
that you are studying (make use of table tag)

Write about your interests (nice place for some lists or perhaps an image as well?)
Write about where you come from (perhaps you could find some images, and use

 them as links?

III)   Design a web page **with image maps**.

Journal entry: The World Wide Web Consortium (W3C) has an HTML validation
service. Give the steps on How does one validate an HTML page and the purpose
behind this validation?

IV)   **Tables:** Design a web page with different tables. Design a web page using tables so
that the content appears well placed.

V)   **Form & CSS:** Create the Registration form using all types of controls. Create the
CSS file and Implement the CSS with HTML.

VI)   **Frames & CSS:** Design a web site using a frameset and open different pages in the
frames. Make use of an external/linked style sheet so that the pages have uniform
style.

VII) **Javascript:**

☐   Create an HTML form that accepts an integer value from the user and then
using JavaScript, prints its factorial.

☐   Design an HTML form for the canteen coffee counter that accepts the item,
quantity and using JavaScript calculates the total along with taxes and displays
back to the user. (make use of list box/check box/radio button/text box etc)

☐   Design a form with a text box and a command button. Using JavaScript,
write a program to check whether the number entered in the text box is a
prime number or not.

.

VIII) Design a form and validate all the controls placed on the Registration form using
JavaScript and regular expressions.

IX)   **jQuery introduction:**
a.   hello world example
b.   calling a function in jQuery and JavaScript

c. Loading jQuery form Google **Journal entry:** why is it better to load the library using Google code?

d. Applying styles to a table using jQuery CSS

e. Design a web page to create the sliding effect using the slideup(), slidedown() and slidetoggle() methods

f. Make use of the **toggleClass(class)** method that adds the specified class styling when clicked upon and removes the specified class styling when clicked for the second time.

X) **XML:**

a. Design a DTD, corresponding XML document and display it in browser using CSS.

b. Design an XML document and display it in browser using XSL.
c. Design XML schema and corresponding XML document.

XI) **PHP:**

a. Design a php page to process a form.

b. Design a php page for authenticating a user.

XII) Design a complete dynamic website with all validations.

#**Note:** Keeping the SYBsc.IT students in mind, although care has been taken to cover the significant areas of Web designing and Programming, but being a vast subject, one semester is not sufficient to cover all the sub-topics during lectures and practical sessions. Hence students are encouraged to do research and practicals on their own in their leisure time, through various books, online sites as advised by the course instructor at the end of every session, in order to gain an in-depth knowledge of this paper.

Continuous Internal Assessment

MCQ / Viva test during practicals

Mid Term practical test.

Contents:

Theory Syllabus for Courses:

S.ITS.4.01 – Software Engineering

S.ITS.4.02 – Modern Operating Systems
S.ITS.4.03 – Multimedia Systems

S.ITS.4.04 – Data Structures using JAVA

S.ITS.4.05 – Statistical Techniques and
Operation Research

Practical Course Syllabus for: S.ITS.4.PR

S.Y. B.Sc.IT   **Course: S.ITS.4.01**

Title: Software Engineering

Learning Objective:

To develop the systematic approach required for software development.

Number of lectures: 75

UNIT 1
Introduction   **(12 lectures)**

What is software engineering?

Phases in the development of software,

Prescriptive Models, Waterfall Model,

Incremental Process Model, Evolutionary Process Models,

Specialized Process Models.

UNIT 2
Software Engineering Practice   **(13 lectures)**

Software Engineering Practice, Communication Practices,

Planning Practices, Modeling Principles,

Construction Practice, Deployment.

UNIT 3

Modeling and Approaches to System Requirements   **(14 lectures)**

Events and system requirements, Things and system requirements,

Data entities and Objects, Entity-Relationship diagram,

Traditional Approach, Object oriented approach

UNIT 4

Performing User Interface Design   **(12 lectures)**

The Golden Rules, User Interface Analysis and Design,

Interface Analysis, Interface Design Steps,

Design Evaluation.

UNIT 5

Testing Strategies and Tactics   **(12 lectures)**

A Strategic Approach to Software Testing,

Test Strategies for Conventional Software,

Object Oriented Software, Validation Testing,

System Testing, Software Testing Fundamentals,

Black Box Testing, White Box Testing

UNIT 6

Software Project Management   **(12 lectures)**

Cost Estimation, Project Scheduling,

Staffing, Software Configuration Management,

Quality Assurance, Project Monitoring, Risk Management.

Continuous Internal Assessment

Presentation / Developing Documentation for Project Undertaken.

Mid Term test.

List Of Text Books

1. ―Software Engineering, Principles and Practice ‖, Hans van Vliet, Wiley.
2. ―Software Engineering, A Practitioner's Approach‖, Roger S. Pressman, TMH
3. ―System Analysis and Design‖

List Of Recommended Reference Books

1. An Integrated Approach To Software Engineering, PankajJalote, Narosa.
2. Software Engineering, S. L. Pfleeger, Macman.

S.Y. B.Sc.IT   **Course: S.ITS.4.02**

Title: Modern Operating System

Learning Objective:

Operating System forms the heart of all computer system which is required for running any kind of application program. This subject focuses on the mechanism involved in building an Operating System and understanding the fundamentals of modern operating system.

Number of lectures: 75

UNIT 1

Introduction To Operating System   **(10 lectures)**

History of Operating System,

Types of Operating System

Batch, Multiprogramming,

Multitasking,

Real-Time

Operating System Structure

Layered,

Monolithic,

Microkernal

UNIT 2

Processes and Deadlock   **(20 lectures)**

Process Management

Creation,

Termination,

States

Thread Model and Implementation,

Interprocess Communication & Synchronization

Race Condition,

Critical Region,

Mutual Exclusion,

Semaphores,

Monitiors

Classical IPC Problems

Dining Philosophers Problem,

Readers and Writers Problem

Process Scheduling(Preemptive and Nonpremptive),

Deadlock

Deadlock Detection And Recovery,

Deadlock Avoidance,

Deadlock Prevention

UNIT 3

Unix Commands and Shell Scripts (10 lectures) Basic Commands

ls, cp, mv, rm,
echo, date, cal etc.

vi Editor

Basic Concepts, Commands,

Programming in vi

Shell Programming

Types of Shell, Environment Variables,

Programming Construct:

loops, conditions,

logical operators

UNIT 4

Memory Management   **(10 lectures)**

Static Allocation, Dynamic Allocation,

Segmentation, Paging, Virtual Memory,

Page Replacement Algorithm

   Optimal Page Replacement Algorithm,

   First-In First-Out

UNIT 5

File System (10 lectures) Files

   Naming, Structure, Types,

   Access, Attribute,

Directories

   Single Level, Hierarchical Level,

   Path Name, Operations

File System Implementation

   Layout, Implementation, Shared Files

UNIT 6

Distributed Operating System (15 lectures) Introduction to Distributed Operating System

   Goals, Hardware Concepts,

   Software Concepts, Design Issues

Multiprocessor System

   Motivation and Classification,

   Multiprocessor Interconnection,

   Types of Multiprocessor

Continuous Internal Assessment

Assignments / Project / Presentation / Case Study

Mid Term test.

List Of Text Books

1. Operating Systems(Concepts & Design) by Milan Milenkovic - Tata McGraw Hill
2. Mordern Operating Systems by Andrew S. Tanenbaum- Pearson Education.
3. Distributed Operating Systems by Andrew S. Tnenbaum, Pearson Education.

List Of Recommended Reference Books

1. The Design of Unix Operating System by Maurice J. Bach – Prentice Hall.
2. Working with Unix by Kaushal Thakker, KiranDattani – BPB Publication
3. Operating System Concepts by Silbershatz, Peterson, Galvin – Addison Wesley.
4. Operating System Design and Implementation by Andrew S. Tanenbaum.

S.Y. B.Sc.IT   **Course: S.ITS.4.03**

Title: Multimedia System

Learning Objective:

To learn the types of multimedia, encoding - decoding and its application.

Number of lectures: 75

UNIT 1

Introduction to Multimedia   **(08 lectures)**

Defining the scope of multimedia,

Hypertext and Collaborative research,

Multimedia and personalised computing,

Multimedia on the map,

Emerging applications, The challenges

UNIT 2

Multimedia Information Representation   **(15 lectures)**

Digitization principles –Analog signals –Encoder design,

Text –Unformatted text -Formatted text -Hyper text,

Images -Graphics -Digitized documents –Digitized pictures,

Audio –PCM speech –CD quality audio Synthesized audio,

Video –Broadcast television –Digital video –PC video -Video content

UNIT 3

Digital Video and Image Compression   **(15 lectures)**

Video compression techniques,

standardization of Algorithm,

The JPEG Image Compression Standard,

ITU-T Recommendations,

The EPEG Motion Video Compression Standard,

DVI Technology

UNIT 4

Operating System Support for Continuous Media Application   **(10 lectures)**

Limitation of Work station Operating system,

New OS support, Experiments using Real Time mach

UNIT 5

Multimedia Interchange   **(15 lectures)**

Quick time Movie File Format, QMFI,

MHEG (Multimedia and Hypermedia Information EncodingExpert Group),

Format Function and representation,

Track model and Object model, Real TimeInterchange

UNIT 6

Multimedia conferencing   **(12 lectures)**

Teleconferencing systems,

Requirements of Multimedia communications,

Shared Application Architecture and embedded Distributed objects, Multimedia Conferencing Architecture

Continuous Internal Assessment

Assignments

Mid Term test

List Of Text Books

Multimedia Systems by John F Koegel Buford—Pearson Education

List Of Recommended Reference Books

Multimedia Commumications by Fred Halsall —Pearson Education

S.Y. B.Sc.IT   **Course: S.ITS.4.04**

Title: **Data Structures using JAVA**

LEARNING OBJECTIVE:

Data Structure are required in almost all programming design. Performance of a program mainly depends on the data structure and algorithms used in the program. This subject forms the basis for selecting the appropriate data structure as needed by the program to improve the efficiency of a program.Knowledge of Data Structure and complexity helps in improving analytical skill .

[Total Lectures 75]

UNIT-I: Introduction To Data Structure   **[15]**

Data Types, Data Structure, Abstract Data Types, What is an algorithm, Rate of growth and its graph with analysis. Time Complexity(Big Oh and Big Omega, Theta Notation,), Master Theorem for divide and conquer,Problems on complexity for divide and conquer, Master Theorem for subtract and conquer and problems on it.

UNIT-II: Stacks, Queues and Recursion   **[10]**

Introduction to Stack, Array Representation of Stack, Notations (infix, prefix and postfix notation),understanding stack operations push, pop, peek , algorithm for converting infix to postfix and infix to prefix, algorithm to separate operator and operand from given string , concept of queue, inserting deleting data in queue,concept of circular queue, inserting deleting data in circular queue, what is recursion, format of recursive function, recursion and memory visualization, examples on recursion, Tower of Hanoi and its complexity.

UNIT-III: Linked List   **[15]**

What is a Linked List, Comparing Linked List with Arrays, advantage and disadvantage of Linked List. Singly Linked List, traversing, insertion node at beginning, ending and at middle,deleting node from beginning, ending and at middle for singly linked list, Doubly Linked List,Insertion node at beginning, ending and at middle for doubly linked list, deleting node from beginning, ending and at middle for doubly linked list, circular linked list, printing content of circular linked list, inserting node at front, end and middle of circular linked list, deleting node from front, end and middle of circular linked list, searching elements from singly, doubly, circular linked list.

UNIT-IV: Trees   [15]

What is a Tree, Binary Tree and Binary search Tree, properties of Binary Tree, Structure of Binary Tree,Types of Binary Trees(Strict Binary Tree, Full Binary Tree, complete Binary Tree, Almost complete Binary Tree), inorder, preorder and postorder traversal with recursion and without recursion,searching element in Binary Search Tree, Finding maximum and minimum element from Binary Search Tree, deleting an element from Binary Search Tree, Threaded Trees, traversal using right thread, AVL Tree, single and double rotation, Expression Trees ,concept of N-ary Tree(Generic Tree), Huffman's coding

UNIT-V: Sorting   [10]

- ➢ Bubble Sort, Selection Sort, Insertion Sort, Radix sort and its complexity
- ➢ Heap property, Heapify, Building Heap, Heapsort algorithm and complexity
- ➢ Merge sort and its complexity.
- ➢ Quick sort and its complexity.

UNIT-VI: Graphs   [10]

Definition of Graph, difference between Graph and Tree, various terminology in Graph(multigraph,complete graph, bipartite, isomorphism, planar and non-planar graph, complete graph, regular graph),Representation of Graph (Adjacency matrix, Path Matrix, Linked Representation), Euler path, Hamilton path, Traversing(Breadth-First Search, Depth-First Search), Spanning Tree, Algorithm for finding minimum spanning Tree- Prim's algorithm, Krushkal's algorithm, shortest path using Dijkastra's algorithm and Warshall's Algorithm,

Continuous Internal Assessment

Assignments / Project / Presentation

Mid Term test.
Class Activity

Text Book:

Data Structure and Algorithms made easy in Java

by NarashimhaKarumanchi

Reference Book:

1. Data Structured by Seymour Lipschutz- Schaum publication

2.Fundamentals of Data Structure by Ellis Horowitz, SartajSahni – GalgatiaBooksource

Title: Statistical Techniques and Operation Research

Learning Objective:

To develop the skill of decision making using statistical techniques and Operation Research

Number of lectures: 75

Unit1 (13 lectures) **Basic statistics**

Basic of statistics, mean, median, mode, measures of variation, mean deviation, standard deviation, variance, measures of Skewness, regression and correlation.

Unit 2   **(12 lectures)**

Discrete and continuous distribution

Binomial distribution:

      Properties of binomial distribution

      Constants of binomial distribution

      Importance of binomial distribution

      Fitting of binomial distribution

Poisson distribution

     Constants of Poisson distribution

     Role of the Poisson distribution

     Fitting a Poisson distribution

Normal distribution:

      Graph of normal distribution

      Importance of normal distribution

      Area under the normal curve

      Fitting a Normal distribution

Unit 3:   **(12 lectures)**

Sampling theory and testing of hypothesis

   Hypothesis testing:

Procedure of testing hypothesis ,

Two tailed and one tailed tests of hypothesis,

Test of significance of large samples.

Tests of significance **of small samples**

   Students t-distribution:

   Properties of t-distribution,

   Application of the t_distribution.

The Chi Square Distribution:

Constants of Chi square distribution,

Use of Chi square test,

Conditions for applying chi square test,

Applications of chi square test

Unit 4

Linear Programming

Introduction to O.R in business and industry, scope of O.R in modern management and decision making Linear Programming: various definition, statements of basic theorems and properties, advantages , limitations and application areas of Linear Programming. Linear programming formulation, Identification of decision variables, constructing objective functions and constraints, graphical methods, simplex method

Unit 5:

Transportation problem and Assignment problems

The transportation algorithm,
Formulation of TP, Determination
of initial solution, Stepwise
improvement to optimal
solution, Degeneracy concepts.

The assignment
 model:

Formulation,
 Unbalanced
 assignment problems,
 dual of assignment
 problem.

Unit 6

PERT and CPM

Network representation of simple projects ,

critical path computation, construction of time schedule,
basic difference between PERT and CPM,

arrow networks , time estimates, earliest expected time ,
occurrence time, forward pass computation ,

backward pass computation probability of meeting scheduled date of completion,
various floats for activities

Continuous Internal Assessment

Problem solving

Mid Term test.

List Of Text Books

1. operation research by Kanti Swaroop
2. Introduction to statics by Gupta and Kapoor

List Of Recommended Reference Books

1. Quantitative techniques in management ND VOHRA

2. Operation research an introduction---Hamdy A Taha
3. Introduction to statistics---Ronald EWalpole

4. Operation researchprinciples and practice—Ravindran, Philips

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S.Y. B.Sc.IT   **Course : S.ITS.4.PR**

Practical – I:

MODERN OPERATING SYSTEMS (MOS)

MULTIMEDIA SYSTEMS

MOS Practical (Linux)   ITS.4.PR

Shell scripts

1) Write a shell script which prints file name followed by first line of each file in the current directory

2) Write a shell script to print the information as to how many files and how many directories are present in current directory.

3) Write a shell script which accepts a filename, displays menu with following options, accepts user choice as number and takes appropriate actions

Number	Menu option	Expected Action
1	Contents	Display the file contents
2	Size of block	Display the file Size in blocks
3	Number of words	Display the number of words in file
4	Last four Lines	Display last five lines of the file
5	First seven Lines	Display first ten lines of the file

4) Write a shell script which accepts a filename, displays menu with following options, accepts user choice as number and takes appropriate actions

Number	Menu option	Expected Action
1	No of users	Displays the No of users looged in
2	Current user	Display the login id of user logged in
3	Current Directory	Display the present working directory
4	Home Directory	Display the home directory of logged in user
5	Concatenate	Display concatenated output from two files which are listed by user.

5) Write Linux shell script which will greet user as per the login time that is

5-12 → Good Morning

12-15→ Good Afternoon

15-19→Good Evening

19-24→ Good Night

0-5→ Good Night

6) Accept a number from user. Now calculate the sum of digits.

7) A year is entered through keyboard, write a program to determine the year is leap or not.

8) write program to print all prime numbers from 1 to 300.

9) Create a group of 2 and give them password so they can work on common project.

AWK Command

1) create file called emp.txt using vi editor with 10 records some of it are

# eno	ename	desg	salary	doj	dob	dept
100	rajesh	ceo	30000	12/3/90	10/1/78	IT
101	mahesh	gm	20000	11/3/95	10/1/81	sales

Solve the query using AWK/ grep command

a) Find the names of emp who work for sales dept

b) Name the employee whose salary is maximum

c) Name the employee whose salary is maximum in IT dept

d) Count the number of employee in each dept.

e) Find the desg and name of employees who are more than 30 years old

f) Find the name of employee who is senior most as per doj.

g) sort the file as per the dob.

tar, put and get command

1) create tree structure in 2 different machines copy subtree of Mahesh in John directory.

/   /

bin sbin etc   home mnt

                                              bin sbin etc   home mnt

                    Mahesh   **John**

Networking in Linux

Setting up LAN

Configuration TCP/IP

Adding windows computer to LAN

IP address classes

Subnetting

Configuring telnet

C an Java Compilers in Linux

1) Use gcc/ cc/ other compiler to compile C and C++ program related to finding area of rectangle by accepting length and breadth from user.

2) Use java compiler to compile and run java program related to applet.

3) Use java compiler to compile and run socket related program in java.

MULTIMEDIA SYSTEMS

Learning Objective:

To learn to program with multimedia application using java.

Number of lectures: 45

For a 1.5 credit course a minimum of 8 programs should be executed. A journal of the printouts of the programs and its output should be maintained. Certified journal will have to be presented at the time of practical exam.

Multimedia Systems practicals

I)   Write a program in java applet to show a bouncing ball.

II) Write a program using java to display different images on selection of image name from combobox .

III) Write a program using java to play different songs on selection of song name from combobox .

IV)   Write a program in java to control the play of video file using start , stop button

V)   Write a program in java to play the audio file based on the key pressed .

VI)   Write a program in java to play two different video files using threads.

VII) Write a program in java to compress an image

VIII) Write a program in java to change the image every 3 seconds

IX)   Write a java program to play the song file only when the user clicks on image.

X)   Song should be stopped when the user clicks the image again

XI) Write a java program to play the video file only when the user clicks on image.The image should also change Video should be stopped when the user clicks the image again.

Continuous Internal Assessment

MCQ / Viva test during practicals

Mid Term practical test.

S.Y. B.Sc.IT   **Course : S.ITS.3.PR**

Practical – II:

DATA STRUCTURE USING JAVA

STATISTICAL TECHNIQUES AND OPERATION RESEARCH

Number of lectures: 90

DATA STRUCTURE USING JAVA

For a 1.5 credit course a minimum of 8 programs should be executed. A journal of the printouts of the programs and its output should be maintained. Certified journal will have to be presented at the time of practical exam.

Learning Objective:

To study different data structures and algorithms used in programs.

Number of lectures: 45

Data Structure Using Java practicals

I) Implement a Queue in Java and perform the following operations:
   a. Create,
   b. Insert,
   c. Delete,
   d. Search a data item

II) Implement a Stack in Java and perform the following operations:
   a. Create,
   b. Push,
   c. Pop,
   d. Search

III) Write a program in Java for implementing Tower of Hanoi.

IV) Implement a Linked List in Java and perform the following operations:
   a. Create,
   b. InsertFirst,
   c. InsertLoc,
   d. DeleteFirst,

     e. DeleteLoc,
     f. Search a data item

V) Implement a Binary Search Tree in Java and perform the following operations:
     a. Create,
     b. Insert,
     c.   Search a data item

VI) Implement Traversing (Preorder, Inorder, Postorder) of Binary Tree in

Java VII) Implement Deletion of a node in Binary Search Tree

VIII) Implement Heap in Java and perform the following
     operation: a. Create,

     b. Insert, and
     c. Delete

IX) Implement Traversing (Breadth-First Search, Depth-First Search) in Java

X) Implement following Sorting Algorithms in Java:
     a. Bubble Sort,
     b. Insertion Sort,
     c.   Selection Sort,
     d.   Heap Sort

STATISTICAL TECHNIQUES AND OPERATION RESEARCH

For a 1.5 credit course a minimum of 8 programs should be executed. A journal of the printouts of the programs and its output should be maintained. Certified journal will have to be presented at the time of practical exam.

Learning Objective:

To develop analytical skill and programming logic.

Number of lectures: 45

Statistical Techniques and Operation Research practicals

I) write a program to implement simplex method

II) write a program to implement L .P using north west corner method

III) write a program to implement T.P using least cost method

IV) write a program to implement Assign problem

V) write a program to calculate mean ,median, mode

VI) write a program to calculate S.D, variance

VII) write a program to implement correlation

VIII) Write a program to implement discrete distribution

IX) Write a program to implement continuous distribution

X) Write a program to implement testing of hypothesis.

Continuous Internal Assessment

MCQ / Viva test during practicals

Mid Term practical test.

Contents:

Theory Syllabus for Courses:

S.ITS.5.01 - Network Security

S.ITS.5.02 - C# with ASP.NET

S.ITS.5.03 - Data Warehousing and Data Mining

S.ITS.5.04 - E-Commerce and M-Commerce Technologies

S.ITS.5.05 - Introduction to Artificial Intelligence

Practical Course Syllabus for: S.ITS.5.PR

S.ITS.5.SCS - Science Communication Skills

T.Y. B.Sc.IT   **Course: S.ITS.5.01**

Title: Network Security

Learning Objective:

To learn techniques of providing network security

Number of lectures: 75

UNIT 1

Introduction   **(13 lectures)**

Security Problems in Computing:

       The meaning of "secure", Attacks,

       The meaning of computer security,

       Computer Criminals

       Method of Defense

UNIT 2

Elementary Cryptography   **(12 lectures)**

Terminology and Background,

Substitution Ciphers, Transpositions,

Encryption Algorithms

AES,

 DES,

 Public Key Encryption,

The uses of Encryption

UNIT 3

Program Security   **(13 lectures)**

Secure Programs,

Non-malicious Program Errors,

Viruses and other Malicious Code, Targeted Malicious Code,

Controls against Program Threats

UNIT 4

Protection in General-purpose Operating Systems   **(13 lectures)**

Protected Objects and methods of protection,

Memory and address protection,

Control of Access to General Objects,

File Protection Mechanisms, User Authentication

Where the Field is headed

UNIT 5

Security in Networks   **(12 lectures)**

Network Concepts

Threats in Networks

Network Security Controls

Firewalls, Intrusion

Detection Systems,

Secure E-Mail.

UNIT 6

Legal and Ethical Issues in Computer Security   **(12 lectures)**

Protecting programs and data,

Information and the law,

Rights of employees and employers,

Redress for Software failure,

Computer Crime,

Ethical Issues in Computer Security,

Case Study of Ethics

Continuous Internal Assessment

Presentation / Case Study / Objective Test. Mid Term test.

List Of Text Books

1. Security in Computing, Fourth Edition, Charles P. Pfleeger - Pfleeger Consulting Group, Shari Lawrence Pfleeger - RAND Corporation ,Publisher: Prentice Hall Pub Date: October 13, 2006
2. Cryptography and Network Security, Atul Kahate Publisher: Tata McGraw-Hill Education Year: 2008.

List Of Recommended Reference Books

1. Cryptography and Network Security Principles and Practices, Fourth Edition By William Stallings
2. Data Communication and Networking, Fourth Edition By Behrouz A. Forouzan Publisher: McGraw Hill

T.Y. B.Sc.IT   **Course: S.ITS.5.02**

Title: C# with ASP.NET

Learning Objective:

Students will learn the latest developments of C# and ASP.NET in framework 4.0. This will equip them with skills required in software industry for developing website projects.

Number of lectures: 75

UNIT 1

Introduction to DOTNET framework 4.0   **(05 lectures)**

Overview of .NET Framework,

Components of .NET framework,

Versions of .NET framework,

Understanding Visual studio 2010 IDE environment:

Design view, Source view,

Output window, Error list window,

Intelligence, Property window,

Object Browser window,

Start page, Toolbar and Toolbox

UNIT 2

C# Language   **(10 lectures)**

Introduction to C#,

Understanding C# in .NET

Overview of C# Literals, Variables, Data types,

Operators, Expressions,

Branching and looping operations

Methods, Arrays, Strings.

Classes and Objects:

        class, objects, constructors,

        static members, static constructors,

        private constructors, copy constructors,

        destructors, member initialization,

        this reference, nesting of classes

Inheritance and Polymorphism:

        Classical inheritance, containment inheritance,

        Defining a subclass, visibility control,

        Defining subclass constructors, multilevel inheritance,

        Overriding methods, hiding methods,

        Abstract classes, abstract methods,

Interface:

        Defining an interface, extending an interface,

        Implementing interface,

        Difference between interface and abstract class

UNIT 3

Delegate, Events and Exception handling in C#   **(10 lectures)**

Delegate

        Delegate declaration, delegate methods,

        Delegate's instantiation, delegate invocation,

        Using delegates, multicast delegates,

Types of errors, exceptions,

        Syntax of exception handling code,

        Multiple catch statement,

        The exception hierarchy, general catch handler,

        Using final statement, nested try blocks,

        Throwing our own exceptions,

        Checked and unchecked operators,

        Using exceptions for debugging

UNIT 4

Controls in ASP.NET   **(20 lectures)**

Introduction to control class

        TextBox control, Button Control,

Label Control, Image control,

ImageButton control, ImageMap control,

DropDownList control, CheckBox control,

RadioButton control, Table control,

Calendar control, SiteMap control,

TreeView control, Menu control,

Validation controls, Login controls,

Database controls

UNIT 5

ADO.NET (15 lectures)

ADO.NET Object model,

Data Binding, Using Connection, Command, DataReader classes,

Queries returning result sets, Passing parameters in queries,

Using Repeater control, Data Adapter,

Using Data Set (Typed),

Data Table, Data Row & Data Column,

Introducing the ADO.NET Entity Framework,

Mapping Your Data Model to an Object Model

UNIT 6

LINQ and Crystal Report (15 lectures)

LINQ:

Introducing LINQ,

LINQ to Objects,

LINQ to XML,

LINQ to ADO.NET

Crystal Report:

Adding a Crystal Report to an ASP.NET Application,

Inserting Fields, Text and Special Fields,

Sorting, Grouping, and Subtotaling,

Select Expert, Dynamic Formatting,

Using the Crystal Reports Viewer

Continuous Internal Assessment

Assignment on unit 1 , unit 2 , unit 3 , unit 4

Mid Term Test.

List Of Text Books

1. ASP.NET 4.0 in simple steps dreamtech press
2. Integrating Crystal Reports into an ASP.NET Application By Vincent Varallo Wrox Publication

List Of Recommended Reference Books

1. ASP.NET – The Complete Reference Tata McGraw Hill.
2. Beginning ASP.NET 4: in C# and VB by Imar Spaanjaars Wrox Publication.
3. C# and .NET 4 by Christian wrox publication.
4. C# 2010 and .NET 4 platform by Andrew Troelsen Apress publication.

T.Y. B.Sc.IT   **Course: S.ITS.5.03**

Title: Data Warehousing and Data Mining

Learning Objective:

To know the basic concepts of Data Warehousing and data mining.

Number of lectures: 75

DATA WAREHOUSING
UNIT 1

Introduction to Data Warehousing   **(10 lectures)**

What is a data warehouse?
Need for data warehousing,

Basic elements of Data warehousing,
Data warehouse architecture. Project
planning and management, The
DWRM Technique,

The data ware house development life cycle.
Data warehouse developing methodologies.

UNIT 2

Data warehouse design consideration and dimension modeling   **(12 lectures)**

OLTP data model and data warehouse model, Star
schema model, snowflake model, Functional
dependency of the data, helper tables,

Implementing many-to-many relationships between fact and dimension tables,
Approach 1-building a bridge table,

ApproachII- denormalizing the dimension
table, Dimensions and facts

UNIT 3

Data Design And Data Representation   **(13 lectures)**

Identifying the source, cleaning the data,
Transforming the data, data extraction, Extract
processing, interface processing, Trigger
processing applying transform rules, Loading,
load process, post load processing, Error
handling, exception handling and audit.

DATA MINING

UNIT 4

Introduction to Data Mining   **(10 lectures)**

Basics of data mining, related concepts,

Data mining issue, social implications of data mining,

Data mining from a data base perspective.

UNIT 5

Data mining techniques and classification   **(15 lectures)**

A statistical perspective on data mining,

Point estimation models based on summarization,

Baye's theorem, Hypothesis testing, regression and correlation,

Neural networks classification introduction, issues in classification,

Statistical based algorithms, distance based algorithms,

Decision tree based algorithms, ID3.

UNIT 6

Clustering and Association rules (10 lectures)

Introduction to clustering, Hierarchical algorithms,
Partitional algorithms, minimum spanning tree,
Clustering large database, BIRCH, Clustering with
categorical attributes. Introduction of association
rules, large item sets, Basic algorithms, Apriori
algorithm, sampling algorithm

Continuous Internal Assessment

Assignments, Written Test

List Of Text Books

1. *Data Warehousing*, Soumendra Mohanty, Tata McGraw Hill
2. *Data Mining Introductory and Advanced Topics*, M. H. Dunham, Pearson Education.
3. Data warehousing fundamentals by Paulraj Ponniah

List Of Recommended Reference Books

1. Ian H.Witten, Data Mining ,MK publishers .
2. W.H. Inmon, *Building the Data Warehouses*, Wiley Dreamtech.
3. R. Kimpall, *The Data Warehouse Toolkit*, John Wiley.

T.Y. B.Sc.IT **Course: S.ITS.5.04**

Title: E-Commerce And M-Commerce Technologies

Learning Objective:

To create an awareness about role of IT in business and to introduce concepts and techniques of e-commerce and m-commerce such as the ecommerce transaction done via paypal, verisign, payment gateway.

Number of lectures: 75

UNIT 1

Overview of Electronic Commerce   **(12 lectures)**

Definition and meaning of e-commerce,

Broad goals of e-commerce, Functions of e-commerce,

Advantages and disadvantages of e-commerce, Scope of e-commerce,

Technology used in e-commerce, e-commerce essentials,

Two faces of e-commerce:

  -sell side

  -buy side (e-procurement)

UNIT 2

Driving the E-Commerce Revolution   **(10 lectures)**

E-Commerce Activities, Matrix of E-Commerce models,

B2C commerce, B2B commerce, E-Commerce strategy,

Shopping cart, Cookies and Electronic commerce,

Domain Name, LDAP, Click Stream Analysis,

Website communication

UNIT 3

Portals   **(10 lectures)**

Functions of Portals,

Portal Technologies,

Features of Portal, Future Portal,

Portals in India, B2B Portals,

Enterprise Information Portal

UNIT 4

Verisign and Electronic Payment System   **(15 lectures)**

Cryptography,

  Public Key Algorithms,

Private Key Algorithms,

Certification and key Distribution,

Digital Signature, SSL,

Introduction to Verisign,

Products & Services of Verisign,

Verisign authentication service,

Types of Electronic Payment system or Payment gateway,

Payment types,

Receipts of payment,

Modern payment system,

E-cash , CyberCash, Digicash,

Payment security, IPsec, Netbanking, Credit Card Business,

Shopping process with Payseal and Paypal

UNIT 5

M-Commerce Technologies   **(20 lectures)**

Introduction to m-Commerce

What is m-Commerce, Why wireless?,

How wireless Technology is employed:

Bluetooth, 2G Cellular Technology, cellular phones

WAP:

How WAP works,

WAP benefit, WAP limitations

The Technologies of M-Commerce

Mobile Communications:

The Transition to 3G,

Introduction, Multiplexing schemes,

Separating uplink and downlink traffic

GSM, Roaming and billing,

Transition towards 3G, GSM migration,

TDMA migration, PDC migration, CDMAone migration

UNIT 6

M-Commerce Services Today   **(15 lectures)**

Introduction, Mobile portals, Mobile information services,

Mobile directory services, Mobile Banking and trading,

Mobile E-Tailing and E-Ticketing, Mobile Entertainment,

Mobile business application and services

Continuous Internal Assessment

Assignment on unit 1, unit 2, unit 3, unit 4

Mid Term Test.

List Of Text Books

1. M-Commerce by Norman Sadeh John and Wiley & Sons publication
2. Electronic Commerce by Elias M.Award Third Edition and Pearson Education publication

List Of Recommended Reference Books

1. E-Commerce: The Cutting Edge of Business, Kamlesh K. Bajaj & Debjani Nag, Tata McGraw Hill
2. E-Commerce and M-Commerce Technologies by P.Candace Deans and IRM Press publication

T.Y. B.Sc.IT   **Course: S.ITS.5.05**

Title:Introduction to Artificial Intelligence

Learning Objective:

To provide students with a basic exposure to the field of Artificial Intelligence

Number of lectures: 75

UNIT 1

Introduction to AI   **(12 lectures)**

What is AI?

The Foundations of Artificial Intelligence

The History of Artificial Intelligence,

The State of the Art

Agents and Environments,

Good Behavior: The Concept of Rationality, the Nature of

Environments, the Structure of Agents

UNIT 2

Searching Techniques   **(13 lectures)**

Problem-Solving Agents, Example Problems,

Searching for Solutions, Uninformed Search Strategies,

Avoiding Repeated States, Searching with Partial Information

Informed (Heuristic) Search Strategies, Heuristic Functions,

Local Search Algorithms and Optimization Problems,

Local Search in Continuous Spaces,

Online Search Agents and Unknown Environments

UNIT 3

Learning from Observation (13 lectures)

Forms of Learning, Inductive Learning,

Learning Decision Trees, Ensemble Learning,

Why Learning Works:

      Computational Learning Theory

UNIT 4

Introduction to ANN (12 lectures)

Units in neural networks,

Network structures,

Single layer feed-forward neural networks (perceptrons),

Multilayer feed-forward neural networks,

Learning neural network structures

UNIT 5

Introduction to Genetic Algorithms (12 lectures)

A Brief History of Evolutionary Computation,

The Appeal for Evolution, Biological Terminology,

Search Spaces and Fitness Landscapes,

Elements of Genetic Algorithms,

A Simple Genetic Algorithm,

Genetic Algorithms and Traditional Search Methods,

Some Applications of Genetic Algorithms

UNIT 6

Introduction to Fuzzy System (13 lectures)

The Case for Imprecision,

A historical Perspective,

The Utility of Fuzzy Systems,

Limitations of Fuzzy Systems,

The Illusion: Ignoring Uncertainty and Accuracy,

Uncertainty and Information,

The Unknown, Fuzzy Sets and Membership,

Chance verses Fuzziness

Continuous Internal Assessment

Assignment on unit 1, unit 2, unit 3, unit 4

Mid Term Test

List Of Text Books

1. Stuart Russel, Peter Norvig, "Artificial Intelligence- A Modern Approach", Pearson Education
2. An Introduction to genetic algorithms- By Melanie Mitchell
3. Fuzzy Logic with Engineering Applications – by Timothy J. Ross

List Of Recommended Reference Books

1. Elaine Rich, Kevin Knight, "Artificial Intelligence"
2. Patterson, "Introduction to Artificial Intelligence and Expert Systems"
3. Jacek M Zurada, "Introduction to Artificial Neural Systems"
4. Ahmad Ibrahim, "Introduction to Applied Fuzzy Electronics", PHI

T.Y. B.Sc.IT   **Course : S.ITS.5.PR**

Practical – I:

Network Security and

Data Warehousing and Data Mining

Number of lectures: 90

Network Security

Learning Objective: To develop a program to implement any 8 of the following algorithms.

For 1st part of the course (2 credits) a minimum of 8 programs should be executed. A Journal of the printouts of the programs and its output should be maintained. Certified Journal will have to be presented at the time of practical exam.

Network Security practicals

I) Lab Experiments to enrich the knowledge about security features provided in the system: Turn on a screensaver password for Windows XP/ open SUSE, Look for security events

within Windows XP, Change ACLs on all files in a Linux directory, View failed login attempts in Linux, Hide and access a Windows share/ Hide a Linux file, Study the

Internet Explorer Security Settings, Configure the Phishing Filter, Configure Windows

XP Startup, Run a remote desktop, Create a restore point, Return to a restore point, View effective permissions in Windows XP.

II) Write a program to generate Symmetric Key.
III) Write a program to implement Cryptogram.
IV) Write a program to code the Substitution Algorithm.
V) Write a program to code the Transposition Algorithm.
VI) Write a program to code the String encryption and decryption using Secret Key.
VII) Write a program to code the Checkerboard Cipher Algorithm.
VIII) Write program implementing the RSA Algorithm.
IX) Write a program to implement the concept of Public key Cryptography.
X) Write a program to implement the concept of AES String/File Encryption.
XI) Write a program to implement the concept of message digest..

Subject : Data warehousing and Data mining

Course code:ITS.5.PR

Objective : to develop the skill of data analytics and to understand the concept of data warehouse.

Software: Oracle 11g and Weka

Practical topics:

1) Design star schema model
2) Implementation of data extraction , transformation and loading
3) Setting up a data mart
4) Implementation of classification algorithm
   a. Naïve Bayes algorithm
   b. Decision tree based algorithms(J48)
5) Implementation of different types of clustering algorithm
   a. K means algorithm
   b. Hierarchical algorithm
6) Implementation of Apriori algorithm.
7) Implementation of classification, clustering and association rule using Knowledge flow.

Practical – II:

C# with ASP.NET

Number of lectures: 90

Learning Objective:

To equip the students with skills required in software industry Students will learn the latest of C# and ASP.NET in framework 4.0 Students can apply the skill learnt in developing website projects

For a 4 credit course a minimum of 16 programs should be executed. A journal of the

printouts of the programs and its output should be maintained. Certified journal will

have to be presented at the time of practical exam.

I) Write a C# code to generate fibonacci numbers in between the sequence along with an option to continue or quit. Accept the start and end numbers from user.

II) Write a C# code to separate the numbers in an array num[20] having odd and even numbers into two arrays even[10] containing only even numbers and odd[10] containing only odd numbers. Accept the numbers from the user.

III) Write a C# code to find a number which appears maximum number of times in an array of n numbers. Repetition is allowed.

IV) Write a C# code to print pascals triangle. Accept the number of rows from the user

V) Write C# code to arrange the name of cities in sorted order. Accept name of 10 cities from the user

VI) Write C# code to use the LINQ (Language-Integrated Query) feature of C# by creating a collection of CarNames stored in string array. Now display all the names using LINQ.

VII) Create methods add(). multiply(), substract() ,divide() with suitable parameters and call these methods using concept of C# delegate.

VIII) Using DataList control in ASP.NET display the following fields ENO ENAME ADDRESS PHOTO from the database. Accept the eno range from the user

IX) Which control should be used to validate:
   a) A password which is entered twice for confirmation
   b) The age of the user to be over 21
   c) The date to be after the 10/10/2000

Justify your answer by writing correct Validators and conditions.

Design a Login screen in ASP.NET which accepts user name and password. On submit it should check from the server whether the user exists or not. If the user exists in web server then he/she should be directed to proper html page with welcome message.

X) Design a Login screen in ASP.NET which accepts user name and password. On submit it should check from the server whether the user exists or not. If the user exists in web server then he/she should be directed to proper html page with welcome message.

XI) Write the following application.
The initial page is called Validator.aspx and it has 7 text boxes representing

(Name, Family Name, Address,City, Zip Code, Phone and e-mail address), and a Check button. Display the page that user gets after clicking on Check button.

The required validation actions are:

- name different from family name,
- address at least 2 letters,
- city at least 2 letters,
- zip-code 5 digits,
- phone according to the format XX-XXXXXXX or XXX-XXXXXXX,
- e-mail is a valid email.

Display the page with the message that user gets after entering only some of the details correctly.

Finally display the page that the user gets after a correct submission of all the details.

XII) Create a screen which accepts student roll no. On click of submit it should display student result in the grid view with fields

Name   Course   Marks   Total   Marks   Percentage

The database table contains table called student (roll no, name, course , address, year)

Result (roll no, subject, marks, total marks)

XIII) Design a purchase order report using crystal report. PO must have the basic fields

VENDOR   SHIP TO   ITEM NO   DESCRIPTION QTY UNIT PRICE   TOTAL

XIV) Using crystal report design simple mark-sheet for SSC result. The data should appear dynamically form database.

XV) Using crystal report design attendance report for SYIT in various subjects.
Data should be taken dynamically from database

XVI) Design the front page of the website using various controls of DOTNET framework Some of the controls are SiteMap control, TreeView control, Menu control, Validation controls, Login controls etc.

Continuous Internal Assessment

Conducting practical test

T.Y. B.Sc.IT   **Course: S.ITS.5.SCS**

Title: Science Communication Skills

Learning Objective:

To create awareness about reading, understanding and writing scientific material in the field of Information Technology. To study synopses of projects given for case study. To prepare a synopsis for your own project. Students are expected to continue and develop a working project in semester VI.

Number of lectures: 12

UNIT 1

Introduction

Relevance of Communication Skills (CS),

Overview of course,

Various aspects of CS:-

       Listening, reading, comprehension,

       Summarization, group discussion, speaking

UNIT2

Listening, Reading and Comprehension

I.   Talk for 15 min by teacher on any project topic. Students don't take any notes.

II.   At the end ask them to write whatever they understood.

III.   They read [synopsis] for 10 min. Then shut pages and write what they recall and understand.

IV.   Random selections of student writings to be read out in class and discussed

UNIT3

Comprehension & Writing a summary

I.   10 -15 min teacher's input on how to make categories of project and what it means.

II.   Groups of 3-4 given a sample of project report and asked to focus on any one topic

III.   Groups of 3-4 with each individual of a group having a different type of material, each individual completes his summary and then exchanges his material with next in group. All in one group separately write 3 different summaries. Then compare with groupp members each summary. Reach a new consensus and summarise.

UNIT4

Reading a simple research paper/synopsis

I.   Why read a synopsis and how to read it

II. Explain the general format of a synopsis title, introduction, scope, project category, process diagram, resources, conclusion

III. What to look for while summarizing a synopsis/ how to select salient features in a synopsis

IV. Students given different synopsis to read and understand which is a good and which is not a good synopsis

V. Students to summarize/ pointwise listing of key features

UNIT5

Writing a good synopsis

I. Explain the structure of an synopsis and the points to remember while writing an abstract

II. Take a case study like library management system and explain writing of synopsis

UNIT6

Evaluation & Feedback

I. Give project cases and let the salient features be written in synopsis format by students

II. Evaluation -The formatting of synopsis (alignment, bold letters, italics, font size etc.) should be given weightage. Content of synopsis should be taken into consideration.

Continuous Internal Assessment:

Feedback :

A questionnaire will have to be prepared and circulated before the start of the evaluation / after they complete the evaluation.

Contents:

Theory Syllabus for Courses:

S.ITS.6.01 – Internet Technologies

S.ITS.6.02 – Enterprise Resource Planning

S.ITS.6.03 – Advanced Java

S.ITS.6.04 – Software Testing

S.ITS.6.PROJ

Practical Course Syllabus for: S.ITS.6.PR

T.Y. B.Sc.IT   **Course: S.ITS.6.01**

Title: Internet Technologies

Learning Objective:

To get an insight of the functions of Internet technology. To develop programs, for network communications.

Number of lectures: 75

UNIT 1

Internetworking Protocols   **(15 lectures)**

Internet Protocol:

      IP Addressing, IP Subnets,

      IP Routing, Method of Delivery,

      The IP address exhaustion problem, IP datagram,

      ARP overview, ARP detailed concept, ARP and subnets,

      Proxy-ARP or transparent subnetting, RARP concept.

Routing Protocols:

      Autonomous systems, Types of Routing and IP routing algorithms,

      Brief introduction and working of RIP,OSPF,BGP.

UNIT 2

Transport Layer Protocols   **(15 lectures)**

Transmission Control Protocol:

      TCP Services and Features, Segment,

      TCP Connection, State Transition Diagram,

      Flow Control, Error Control,

Congestion Control, Options, TCP Package.

UNIT 3

Network Programming (15 lectures)

Basic Network Concepts, Basic Web Concepts,

Streams, Sockets for Clients, Sockets for Servers,

Secure Sockets, UDP Datagram and Sockets,

Remote Method Invocation:

Architecture, RMI Programming.

UNIT 4

Wireless IP and Introduction to Wireless Systems and Application (10 lectures)

Wireless Concepts ,

Why wireless? Introduction to WiFi, Wimax.

Applications of Wireless networking.

Wireless systems and applications,

Wireless Devices and Operating Systems.

UNIT 5

Introduction to WMLScripting (10 lectures)

Wireless Markup Language (WML) Basics:

Basic Structure, Text Formatting,

WML Objects and Syntax:

Templates, passing Variables,

Commands, Meta

UNIT 6

WMLScript Programming **(10 lectures)**

WMLScript Programming:

    Scripting Structures, Functions,

    WML Script Variables, Operators,

    Statement and Expressions,

    Calling WMLScript Functions.

Continuous Internal Assessment

MCQ/Presentation/Case Studies

Midterm test

List Of Text Books

4. TCP/IP Tutorial and Technical Overview, ibm.com/redbooks
5. TCP/IP Protocol Suite, 4E, Forouzan
3. Java Network Programming 3rd Edition, Elliotte Rusty Harold O'reilly

3. Wireless Markup Language (WML) Scripting and Programming using WML, cHTML and xHTML, William Routt.

List Of Recommended Reference Books

1. WML and WMLScript   ------V .Mukhi, V. Kalantri, S. Mukhi

4. http://www.developershome.com/wap/wml/wml_tutorial.asp
5. Web Standards Solutions The Markup and Style Handbook, Dan Cederholm.

T.Y. B.Sc.IT **Course: S.ITS.6.02**

Title: Enterprise Resource Planning with SAP

Learning Objective:

To introduce the concept of ERP systems along with SCM's structures and special focus on Material Management module along with SAP Business One software demos as a learning tool.

Number of lectures: 75

UNIT 1

ERP-An Introduction   **(12 lectures)**

What is ERP?

    The Need for ERP, Benefits of ERP,

    Business Models, Growth of ERP in India

ERP Implementation Lifecycle introduction

Vendors, Consultants & Users

    In-house Implementation Pros and Cons,

    Vendors, Consultants, End-Users

UNIT 2

Supply Chain Management – I   **(13 lectures)**

Introduction –

    What is Supply Chain? Its objective,

    Supply Chain Decision making,

    Process View of a Supply Chain,

    Examples of Supply Chains

The Network –

    The Role of Distribution in the Supply Chain,

    Factors that influence the Distribution Network Design,

    Design Options for a Distribution Network,

    E-Business and the Distribution Network,

    Channels of Distribution, Distribution Networks in Practice.

UNIT 3

Supply Chain Management - II   **(13 lectures)**

The Customer service dimension –

    Customer Service and Customer Retention,

    Service driven logistics systems,

    Setting customer service priorities and service standards

Benchmarking the Supply Chain –

    Benchmarking the logistics process,

    Mapping supply chain processes,

    Supplier and distributor benchmarking,

    Setting benchmarking priorities, performance indicators

UNIT 4
ERP Modules   **(12 lectures)**

Finance, Sales and Distribution,

Human Resource Management,

Material Management

UNIT 5 [Text Book 4. Chap 2]
Materials Management organizational structure in SAP   **(13 lectures)**

Client Structure, Company
Plants, Storage Locations
Warehouse and storage Types
Purchasing Organization
Business Examples – Organizational Structure

UNIT 6 [Text Book 4. Chap 20, 21, 22]   (12 lectures)
Inventory Management

    Goods Movements, Goods Issue,

    Goods Receipt, Physical Inventory

    Returns, Reservations, Stock Transfers,

    Business Examples.

Goods Issue

    To Production Order, To Scrap,

    For Sampling, Posting, Reversal,

    Business Examples.

Goods Receipt

For a Purchase Order, For a Production Order,

Entry of inventory, Other Goods Receipts,

Business Examples

Continuous Internal Assessment

Assignments on unit 1-4 / Mid Term Test / Case Study of ERP implementation

Midterm test

List Of Text Books

1. "ERP", Alexis Leon, Tata McGraw Hill.
2. "Supply Chain Management Strategy, Planning and Operation", S Chopra, P. Meindl and D. Kalra, Pearson.
3. "Logistics and Supply Chain Management", Martin Christopher, Pearson.
4. Materials Management with SAP ERP, 3rd Edition, Martin Murray, SAP PRESS.

List Of Recommended Reference Books

1. Alexis Leon, "ERP Demystified", Tata McGraw Hill
2. "Enterprise Resource Planning", E. Monk, B. Wagner, Cengage Learning

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T.Y. B.Sc.IT   **Course: S.ITS.6.03**

Title: Advanced Java

Learning Objective:

To equip the students with skills required in software industry. Students will learn the latest of Java through Struts2 and Hibernate. Students can apply the skill learnt for projects.

Number of lectures: 75

UNIT 1

Java Database Connectivity [JDBC]   **(10 lectures)**

Introduction to JDBC Architecture,Type I Driver (JDBC-ODBC Bridge), Types of Driver,

Understanding Statement,

PreparedStatement,CallableStatement Interfacethrough examples,

Understanding ResultSet, ResultSetMetadata interface through examples,

Difference between execute(), executeUpdate(), executeQuery() method, Transactions, Commits, Rollbacks, and Savepoints Batch Processing

UNIT 2

Servlet **(10 lectures)**

What is a Servlet?**,**

Servlet Lifecycle**,** Servlet API**,**

GenericServlet and HttpServlet,

ServletConfig & ServletContext,
Handling Form data with get and post request**,**

Initializing a servlet**,** Filtering Requests and Responses**,**
Redirecting Request**,** Finalizing a servlet**,**

Using cookies and session tracking

UNIT 3

JSP **(15 lectures)**

What is JSP page?,

Lifecycle of JSP page, JSP
syntax usingDirective,

Declaration, Expression, Scriplet, Comment,
Using javabean and Action Tag in JSP,

JSP implicit objects,

Using JSP standard tag library (JSTL),
Session management, Exception handling,

Custom tag, Transferring Control to Another Web Component,
Using JDBC in JSP

UNIT 4

Basic of Struts2 **(10 lectures)**

Understanding MVC architecture,
Struts2 framework

Working with Struts2 Action –

Introducing Struts 2 actions**,**
Packaging your actions,
Implementing actions

UNIT 5

Building Struts2 Application (15 lectures) Adding workflow with interceptors –

Why intercept requests?
Interceptors in action**,**

Surveying the built-in Struts 2 interceptors**,**
Declaring interceptors**,**

Building your own interceptor

Data transfer: OGNL and type conversion

Data transfer and type conversion:

common tasks of the web applicationdomain,
OGNL and Struts 2, Built-in type converters,
Customizing type conversion

Validation framework –

RequiredFieldValidator Class**,**

RequiredStringValidator Class

ExpressionValidator Class,

Email Validator Class,

RegexFieldValidator Class

DateRangeFieldValidator Class

UNIT 6

Hibernate   **(15 lectures)**

Introduction to Hibernate,

Understanding ORM (Object Relational Mapping),
Understanding Transient, Persistent and

Detached Object states,

Issues while writing manual JDBC code,
Hibernate and JPA (Java Persistence
API), Writing persistence classes,

Handling CRUD operations in Hibernate,

Mapping Inheritance between classes with tables in database

Continuous Internal Assessment

Assignments on unit 1- 4 / Mid Term Test.

List Of Text Books

3. Struts 2 in Action by Donald Brown, Chad Michael Davis, and Scott Stanlick Manning publication

4. Pure JSP by James Goodwill Techmedia SAMS publication
5. Hibernate in Action by Christian Bauer and Gavin KingManning publication

List Of Recommended Reference Books

3. Java Servlet Programming, Author: Jason Hunter, O'Reilly Publication
4. Struts 2 Black Book
5. Database Programming with JDBC and Java – O'Relly Publication

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T.Y. B.Sc.IT   **Course: S.ITS.6.04**

Title:Software Testing

Learning Objective:
To develop the skill of software testing

Number of lectures: 75

UNIT 1
The basics of software testing   **(10 lectures)**
Terms and Motivations:
       Error and Bug Terminology, Testing Terms, Software Quality
The Fundamental Test Process
       Test Planning and Control,
       Test Analysis and Design,
       Test Implementation and Execution,
       Evaluation of the Test Exit Criteria and Reporting,
       Test Closure Activities

UNIT 2
Testing in software life cycle   **(15 lectures)**
The General V Model
Component Test:
       Explanation of Terms, Test Objects,
       Test Environment, Test Objectives, Test Strategy
Integration Test:
       Test Objects, Test Environment,
       Test Objectives, Integration Strategy
System Test:
       Test Objects, Test Environment, Test Objectives,
       Problems in System Test Practice
Acceptance test:
       Testing for user acceptance,
       Operational testing, Field testing

UNIT 3
Static Testing   **(15 lectures)**
Structured Group Examinations:
       Foundations, Review, the General Process,
       Roles and Responsibility, Types of Review
Static Analysis:
       Data Flow Analysis, Control Flow Analysis,
       Determining Metrics

UNIT 4
Dynamic Analysis _Test Design Techniques   **(15 lectures)**

Black Box Testing:
       Equivalence Partitioning, Boundary Value Analysis,
       Use Case Testing, State Transition Testing,
       General Discussion Of Black Box Testing

White Box Testing:

 Statement Coverage, Branch Coverage, Test of Conditions,
General Discussion of White Box Testing

UNIT 5
Test Management   **(10 lectures)**

Test Organization:
 Test Teams, Tasks
Test Planning:
 Quality Assurance Plan, Test Plan, Prioritizing Tests
Cost and Economy Analysis:
 Cost Of Testing, Test Effort Estimation
Definition of Test Strategy:
 Preventive Vs Reactive Approach,
 Analytical vs. Heuristic Approach

UNIT 6
Test Tools   **(10 lectures)**

Types of Test Tools:

 Tools for Test Management and Control,

 Tools for Test Specification, Tools for Static Testing,

 Tools for Dynamic Testing

Selection and Introduction Of Test Tools

List Of Text Books

1. Software testing foundations – Andreas Spillner , Tilo Linz , Hans Schaefer (SPD publication)
2. Software Testing –Ron Patton second edition

List Of Recommended Reference Books

1. Software engineering – A Practitioners Approach by Roger s Pressman
2. Software testing –Principles,Techniques and Tools - Tata Mc-Graw Hill education Pvt . Ltd ,New Delhi
3. Software testing Techniques -Dream Tech Press ,New Delhi, 1990

T.Y. B.Sc.IT   **Course: S.ITS.6.PROJ**

Title: Project

Learning Objective:

To build an innovative software solution for a well defined problem by applying the knowledge of all the application oriented software learnt in the BSc.IT course and beyond.

Students are expected to continue the project which they had started in semester
V. Project will carry 8 credits with 200 Marks.

Students can do live project in industry or in-house project.

Students are expected to give time equivalent to 12 lecture periods/week, out of which 3 periods will be contact time for guidance from internal guide. There will be continuous internal assessment (CIA) for 40% of the credit (80Marks).

This will consist of:

CIA 1 → assessment of synopsis and viva on it

CIA 2 → analysis of requirement gathering, system design including DFD, Use case, ER, Normalization, Context level diagrams etc.

Remaining 60% of the credit (120Marks) will be end semester examination consisting of documentation, presentation and viva. This will be jointly examined by the project guide and external examiner under the subheading of marks as follows:

Documentation	Presentation (validation, database handling)	viva	Execution of various modules with report and testing	System design understanding
30	30	20	30	10

List of project categories

1) Hardware projects based on microcontroller / PIC
2) Networking projects
3) Mobile projects
4) Wireless technologies
5) Website projects
6) Desktop application
7) Real-time application in Linux/Unix

8) Or any other suitable project which is approved by the project guide

Suggested format for project report S. ITS.6.PROJ

1) Cover page
2) Certificate from college(for in-house / external project)
3) Synopsis of project
4) Project report
   a) Table of content
   b) Definition of problem
   c) Objective and scope of project
   d) System analysis and design
       i)   User requirement
             ▪ Functional requirement

             ▪ Non-functional requirement

       ii)   Normalization
       iii) DFD , context level diagrams
       iv)   Flowchart, ER diagram
       v)   Use case diagrams
   e) Feasibility study
       i)   Technical feasibility
       ii)   Economical feasibility
       iii) Operational feasibility
   f) Software engineering paradigm applied
   g) Software and hardware requirement specification

h) PERT chart, Gantt chart
i) Coding
j) Code efficiency

k) Validation checks
l) Testing

- Test techniques(white box and black box testing)
- Writing Test cases
- Using test data
- Generating defect reports

- Use of testing tools(manual/automated)

m) System security measures

n) Cost estimation of project
o) Reports
p) Screen shots
q) Future enhancement
r) Bibliography
s) Glossary

J) Students have to submit black book to college(1 per group) in A4 size with one side written (approx 150-200 pages) along with CD having full documentation and codes

K) Students doing project in industry will have to get certificate from the company.

T.Y. B.Sc.IT   **Course : S.ITS.6.PR**

Practical :

INTERNET TECHNOLOGIES

ENTERPRISE RESOURCE PLANNING WITH SAP

ADVANCED JAVA

SOFTWARE TESTING

Number of lectures: 90

INTERNET TECHNOLOGIES

Learning Objective: To program internet applications using Socket
Programming, RMI and XML technology used in Internet.

For a 2 credit course a minimum of 8 programs should be executed. A journal of the printouts of the programs and its output should be maintained. Certified journal will have to be presented at the time of practical exam.

Internet Technology practical list

W)   Write a socket program using TCP to find the factorial of a number.
Y)   Write a socket program using UDP to find the reverse of a number.
J)   Write a socket program using TCP to print greatest of two numbers.
IV)   Write a socket program using UDP to whether the number provided is even or odd.

JJ)   Write a program using RMI concept to find the greatest of the three numbers
VI)   Write a program using RMI concept to perform basic arithmetic operations.

VII) Write a program using RMI concept to find the factorial of a number.

VIII) Write a program using RMI concept to implement a menu driven task.

IX)   Write a program in XML to accept a number and calculate its square.

B   Write a program in XML to accept two numbers and print its sum.
XI)   Design a form providing menu and having an interface to accept the user data and

      delivering the output using XML.

XII) Configure mobile devices in a network to enable data exchange between the

      devices.

Continuous Internal Assessment

 MCQ / Viva test during practicals

Mid Term practical test.

Title: Enterprise Resource Planning with SAP

Learning Objective:

To introduce the concept of ERP systems to students with the help of case study simulation tutorials using SAP Business One software demos as a learning tool.

Practical List:

1. Case study on Purchase Order

2. Case study on MRP

3. Case study on Sales Order

4. Case study on Warehouse management

5. Case study on Bill of Materials

6. Case study related to Goods movement

7. Case study related to Invoice handling.

ADVANCED JAVA

Learning Objective:

To equip the students with skills required in software industry. Students will learn the latest of Java through Struts2 and Hibernate Practicals. Students can apply the skill learnt for projects.

For a 2 credit course a minimum of 8 programs should be executed. A journal of the printouts of the programs and its output should be maintained. Certified journal will have to be presented at the time of practical exam.

I) Write a servlet code with the initialization parameter.

II) Implement a Stack in Java and perform the following operations: (Create, Push, Pop, Search a data item)

III) Write Filter program in servlet to block the user from particular IP address.
IV) Write a servlet which displays the cookie name and the value.

W)   Create Bulletin Board Servlet

This is a bulletin board that is maintained by the server. Entries are parsed as HTML, so you can post anything from plain text to applets. The entries are saved to a file, so the board will survive server shutdowns.

Submit Message   Clear Message   View Postings

VI) Create a "**DataServlet.java**" which is the servlet which is making the connection to the database and retrieves the data from database. After getting the values from database, data is added to the Data List. Then data list is added to the request object and sent to the JSP page. In JSP page the values are displayed using **Iterator** class object.

VII) Create an html page with fields, eno, name, age, desg, salary. Now on submit this data to a jsp page which will update the employee table with matching eno.

VIII) Write jsp code to demonstrate the use of session object in shopping cart.

IX) Write JSP code to do login authentication from database and redirect to new JSP page as per the role assigned in the database.

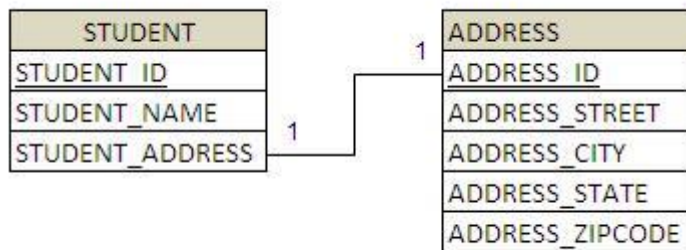X) Using struts validation framework do validation for

1)email

2)phone
3)emp no
4)emp
name 5)age

XI) Create a login interceptor in struts which always intercepts and displays a login screen when the user has not logged in and tries to visit some page on the website.

XII) To persist the java objects using the Hibernate Object/Relational Mapping (ORM) framework

XIII) Consider one to one relation as shown. Now map this relationship using hibernate

STUDENT		ADDRESS
STUDENT_ID	1	ADDRESS_ID
STUDENT_NAME		ADDRESS_STREET
STUDENT_ADDRESS	1	ADDRESS_CITY
		ADDRESS_STATE
		ADDRESS_ZIPCODE

Continuous Internal Assessment

 MCQ / Viva test during practicals

Mid Term practical test.

Software Testing

Learning Objective:

To develop the skill of Software Testing

For the 2nd part of the course (2 credits) a minimum of 8 programs should be executed.

A journal of the print outs of the programs and its output should be maintained.

Certified journal will have to be presented at the time of practical examination.

Software Testing practicals

I)   Design of different types of test cases
II)   Component testing
III)   Data flow analysis test
IV)   Equivalence class partitioning test
V)   Boundary value analysis test
VI)   Use case based test
VII)   Control flow based test
VIII)   Branch condition test
IX)   Path coverage test
X)   Static testing using tools
XI)   Data based test
XII)   Interface based test data generators
XIII)   Properties based test using tools
XIV)   Bitmap testing

Continuous Internal Assessment

MCQ / Viva test during practicals

Mid Term practical test.