



# St. Xavier's College – Autonomous Mumbai

## Syllabus For 6<sup>th</sup> Semester Courses in Information Technology (June 2012 onwards)

### 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 – Data Warehousing and Data Mining
- 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**

1. TCP/IP Tutorial and Technical Overview, ibm.com/redbooks
2. TCP/IP Protocol Suite, 4E, Forouzan
3. Java Network Programming 3<sup>rd</sup> Edition, Elliotte Rusty Harold O'reilly
4. Wireless Markup Language (WML) Scripting and Programming using WML, cHTML and xHTML, William Rott.

## **List Of Recommended Reference Books**

1. WML and WMLScript -----V .Mukhi, V. Kalantri, S. Mukhi
  2. [http://www.developershome.com/wap/wml/wml\\_tutorial.asp](http://www.developershome.com/wap/wml/wml_tutorial.asp)
  3. Web Standards Solutions The Markup and Style Handbook, Dan Cederholm.
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**T.Y. B.Sc.IT**

**Course: S.ITS.6.02**

**Title: Enterprise Resource Planning**

## **Learning Objective:**

To introduce the concept of ERP systems along with SCM and its structures, with special focus on certain modules, their implementations and benefits.

**Number of lectures: 75**

## **UNIT 1**

### **ERP-An Introduction**

**(08 lectures)**

What is ERP?,

The Need for ERP, Benefits of ERP,  
Business Models, Growth of ERP in India

## **UNIT 2**

### **Supply Chain Management – I**

**(15 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**

**(15 lectures)**

##### **The Customer service dimension –**

Customer Service and Customer Retention,  
Service driven logistics systems,  
Setting customer service priorities and service standards

##### **Measuring logistics costs and performance –**

Total cost analysis and Principles of costing,  
Logistics and shareholder value,  
Customer profitability analysis,  
direct product profitability,  
Cost drivers and activity-based costing.

##### **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**

#### **ERP Implementation**

**(15 lectures)**

ERP Implementation Lifecycle,  
Evaluation and selection of ERP package,  
Project Management and Monitoring,  
Team Training and Testing,  
End user training and Going Live,  
Post Implementation and Maintenance

### **UNIT 6**

#### **Vendors, Consultants & Users**

**(10 lectures)**

In-house Implementation Pros and Cons,  
Vendors, Consultants, End-Users

#### **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

### **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**  
**Title: Advanced Java**

**Course: S.ITS.6.03**

### **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, Scriptlet, 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 application domain,  
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**

1. Struts 2 in Action by Donald Brown, Chad Michael Davis, and Scott Stanlick  
Manning publication
2. Pure JSP by James Goodwill Techmedia SAMS publication
3. Hibernate in Action by Christian Bauer and Gavin King Manning publication

##### **List Of Recommended Reference Books**

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

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**T.Y. B.Sc.IT**

**Course: S.ITS.6.04**

**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 I-building a bridge table,  
Approach II- 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.

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**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
- 5) 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
- 6) Students doing project in industry will have to get certificate from the company.
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**T.Y. B.Sc.IT**

**Course : S.ITS.6.PR**

**Practical :**

## **INTERNET TECHNOLOGIES**

### **ADVANCED JAVA**

**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**

- I) Write a socket program using TCP to find the factorial of a number.
- II) Write a socket program using UDP to find the reverse of a number.
- III) 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.

- V) 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.
- X) 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.

## 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.
- V) 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.

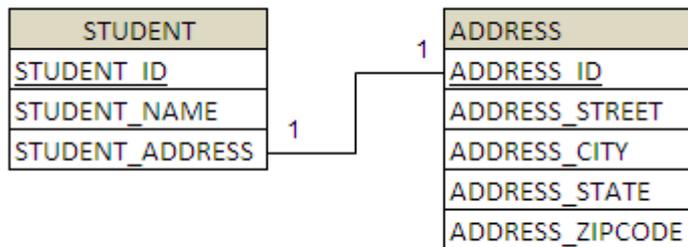
The image shows a web form interface for a bulletin board. It consists of a text input field on the left with the label "Enter message:". To the right of the input field is a list box with up and down arrow buttons. Below the input field and list box are three buttons: "Submit Message", "Clear Message", and "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



### Continuous Internal Assessment

MCQ / Viva test during practicals  
Mid Term practical test.