



# St. Xavier's College – Autonomous Mumbai

## Syllabus For 5<sup>th</sup> Semester Courses in Information Technology (June 2014 onwards)

### Contents:

#### Theory Syllabus for Courses:

S.ITS.5.01 - Network Security

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

S.ITS.5.03 - Software Testing

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

**T.Y. B.Sc.IT**  
**Title: Network Security**

**Course: S.ITS.5.01**

**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
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**T.Y. B.Sc.IT**  
**Title:C# with ASP.NET**

**Course: S.ITS.5.02**

### **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,

### **UNIT 5**

**ADO.NET**

**(15 lectures)**

ADO.NET Object model,

Database Control, Data Grid and 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

### LINQ:

Introducing LINQ and LINQ architecture,  
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

## **UNIT 6**

### **Ajax and JQuery**

**(15 lectures)**

Introducing AJAX, using ASP.NET AJAX,  
Web Services and Page methods in AJAX websites.

### JQuery

Introduction to JQuery,  
JQuery Syntax, modifying DOM with JQuery,  
Effects with JQuery, JQuery extensibility.

### **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.

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

**Course: S.ITS.5.03**

**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:

Integration Strategy, System Test,

##### Acceptance test:

Testing for user acceptance, Operational testing,  
Field testing, alpha testing and beta testing,  
Static testing, Foundations, Review,  
Walkthroughs, inspections

The General Process, Roles and Responsibility and Types of Review

### **UNIT 3**

#### **Functional testing**

**(10 lectures)**

Boundary value analysis testing,  
Robustness testing,  
Worst case testing,  
Equivalence class testing,  
Decision table based testing,  
Cause effect graphing technique and  
State transition testing.

### **Unit 4**

#### **Structural testing**

**(15 lectures)**

Control flow testing,  
Statement coverage,  
Branch coverage,  
Conditional coverage and path coverage,  
Data flow testing,  
Basis path testing, cyclomatic complexity,  
Mutation testing, mutation and mutants,  
Mutation operators and mutation score and slice based 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**

**Advanced concepts of software testing**

**(15 lectures)**

Metrics and models in software testing,  
Software metrics, categories of metrics,  
What should be measured during testing?  
Testing web applications,  
Functional testing, user interface testing, navigation testing and form based testing,  
automated test data generation using genetic algorithm, initial population,  
Crossover and mutation, fitness function and algorithm for generating test data.

**List Of Text Books**

1. Software Testing by Yogesh Singh

**List Of Recommended Reference Books**

1. Software testing foundations – Andreas Spillner , Tilo Linz , Hans Schaefer (SPD publication)
2. Software Testing –Ron Patton second edition
3. Software engineering – A Practitioners Approach by Roger s Pressman
4. Software testing –Principles ,Techniques and Tools - Tata Mc-Graw Hill education Pvt . Ltd ,New Delhi

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**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  
Students will learn the ecommerce transaction done via PayPal , how verisign works, how payment gateway works. Students can apply the skill learnt in developing website projects on e-commerce, m-commerce

**Number of lectures: 75**

**Unit 1**

**(10 lectures)**

**Overview of Electronic Commerce**

Understanding Trade / Business cycle  
Business process and Business activity  
History of e-commerce, Generic Model of E-Commerce.  
Evolution of E-commerce.  
Global and Indian scenario.  
Difference between Conventional Commerce and Electronic Commerce  
Classification of ecommerce- B2B,B2C, C2C,C2B,G2G, G2C, B2G sites  
Introduction to IT Act and its role to encourage E-business.  
Growing E-learning and E-Governance.  
Understanding horizontal and vertical market.  
Growth of Online Retailing and E-marketing concepts.

Features & benefits of E- Commerce – Impacts,  
Challenges & Limitations of E-Commerce.

## **Unit 2**

**(10 lectures)**

### **E-commerce Models and Portals**

#### **E-commerce Models**

Store-front Model,  
Brick and Mortar Model,  
Build to Order Merchant Model,  
Service Provider Model,  
Subscription based Model,  
Broker Model,  
Advertiser Model,  
Virtual Mall Model  
Infomediary Model.

#### **Portals**

Functions of Portals, Portal Technologies, Features of Portal  
Future Portal, Portals in India, B2B Portals, Enterprise Information Portal  
Different types of Portals.

## **Unit 3**

**(15 lectures)**

### **Payment, Security and Privacy Issues in Online Business**

Security concerns in e-commerce, authenticity, privacy, integrity, non-repudiation  
Public and Private Key, encryption.  
Cryptography and types of cryptography.  
Digital signature.  
Role of Certificate Authority.  
Working of Payment Gateway.  
Firewall and types of firewall  
Intrusion Detection System, and Honey pots  
SSL and IPSec protocol.  
NetBanking  
DoS and DDoS attack  
RSA

## **Unit 4**

**(15 lectures)**

### **Advance Technologies of E-commerce**

Rich Internet Application, Web 2.0, REST Web Services,  
Web Mashup, Working of Search Engines,  
SEO, LDAP, EDI, VPN, click stream analysis,  
Introduction to Hadoop.  
E-CRM - Concept & definition,  
features Goals of E-CRM business framework,  
Types of E-CRM.

## **Unit 5**

**(15 lectures)**

### **M-Commerce Technologies**

#### **INTRODUCTION TO m-COMMERCE**

What is m-Commerce  
Why wireless?  
How wireless Technology is employed



## Bluetooth-2G Cellular Technology

### WAP

- WAP architecture
- How WAP works
- WAP benefit
- WAP limitations

Components of mobile communication.

Working of mobile communication technology.

## **THE TECHNOLOGIES OF m-COMMERCE.**

Mobile Communicatios: The Transition to 3G.

Introduction

Multiplexing schemes [TDMA, FDMA, CDMA]

Separating uplink and downlink traffic

GSM migration

PDC migration

Cdmaone migration

## **M-Commerce Services Today**

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

## **Unit 6**

**(15 lectures)**

### **Case Study of E-Commerce**

Amazon – success story, core values, business model, history, growth, future plan, comparison with other ecommerce sites.

E-bay - business model, history, future plan

Verisign

Shopping process with Payseal and Paypal.

Flipkart-history, business model, growth,

comparison with other ecommerce sites, future plan

Dotcom –its rise, fall and analysis

Infrastructure for shopping cart.

## **Continuous Internal Assessment**

Assignment on unit 1, unit 4, unit 6

Mid Term Test.

## **List Of Text 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

**List Of Recommended Reference Books:**

- 1) M-Commerce by Norman Sadeh John and Wiley & Sons publication.
- 2) E- Commerce Strategies, Technology and applications (David) Tata McGrawHill
- 3) Introduction to E-commerce (jeffrey) Tata- Mcgrawhill

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**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

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

**Course: S.ITS.5.PR**

**Practical – I:**

**Network Security and**

**Software Testing**

**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.

### **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) Basis path testing

- II) Component testing
- III) Data flow analysis test
- IV) Equivalence class partitioning test
- V) Boundary value analysis test
- VI) Robustness based testing
- VII) State transition testing
- VIII) Decision table based test
- IX) Branch condition test
- X) Mutation test
- XI) Navigation test
- XII) Data based test
- XIII) Form based testing
- XIV) Slice based test
- XV) Testing using tools

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

**Course: S.ITS.5.PR**

**Practical – II:**

### **C# and 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(), subtract() ,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 password which is entered twice for confirmation
  - The age of the user to be over 21
  - 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
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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
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XIV) Using crystal report design simple mark-sheet for SSC result. The data should appear dynamically from 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