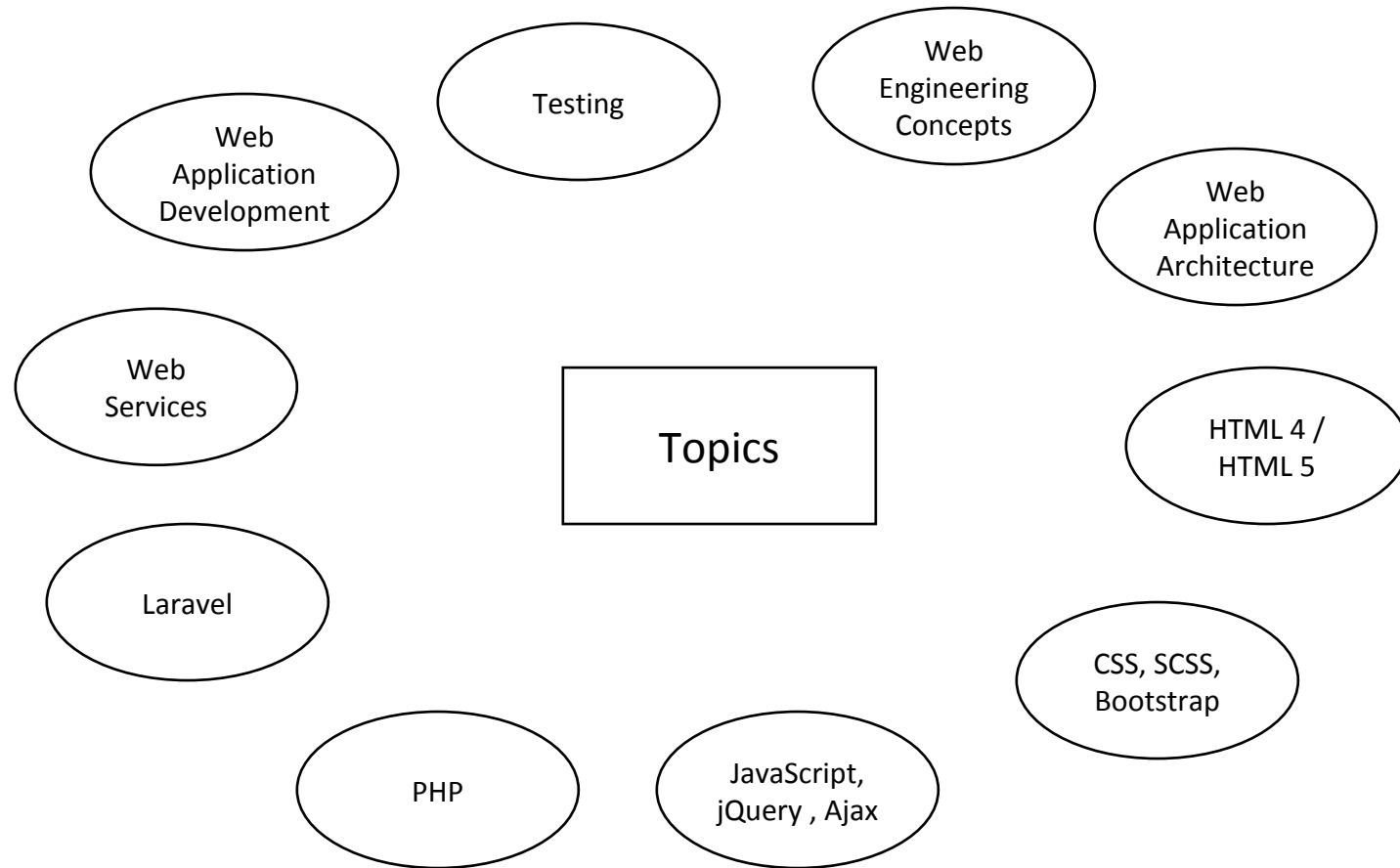# INTRODUCTION TO WEB ENGINEERING

## MUSADAQ MANSOOR

# Agenda

- Course Theme
- Evaluation Criteria
- Text Books
- Topics
- Introduction
- Web Engineering
- Web Application

# Course Theme

- Lecture:
  - Will cover contents of the Course from papers , web resources and Book of web engineering

- Assignment:
  - Study Articles
  - Project Tasks

- Quiz:
  - After every 2-3 lectures
  - Will cover the previous lectures

- Semester Project
  - Small Project
  - Will cover web technologies and will enrich your web application development skills

# Topics



Topics

- Testing
- Web Engineering Concepts
- Web Application Development
- Web Application Architecture
- Web Services
- HTML 4 / HTML 5
- Laravel
- CSS, SCSS, Bootstrap
- PHP
- JavaScript, jQuery, Ajax

# Introduction to Web

- From 1995 onward, the World Wide Web has grown at exponential rate and continues

- With increase dependency on web we need web application equipped with quality of service attributes i.e. Performance, reliability, security, maintainability, scalability, accessibility, compatibility and interoperability etc.

- Web application development is not simple

- Involves planning, Web architecture and system design, testing, quality assurance, performance evaluation, and continual update and maintenance

- ad hoc development is not appropriate for large, complex Web systems, and it could result in serious problems e.g. frequent downtime, faulty or stall contents

- "We cannot hide the problems on the Web"

# A Survey by the Cutter Consortium

The top problem areas of large-scale Web application projects

- Failure to meet business needs (84%)

- Project schedule delays (79%)

- Budget overrun (63%)

- Lack of functionalities (53%)

- Poor quality of deliverables (52%)

# Web Engineering?

- Uses scientific, engineering, and management principles and systematic approaches to successfully develop, deploy, and maintain high-quality Web systems and applications (Murugesan et al., 1999).

- The aims is to bring Web-based system development under control, minimize risks and improve quality, maintainability, and scalability of Web applications.

# Web Engineering?

- Web engineering is way of developing and organizing knowledge about Web application development and applying that knowledge to develop Web applications, or to address new requirements or challenges.

- It is also a way of managing the complexity and diversity of Web applications.

- Web engineering helps to create an infrastructure that will allow evolution and maintenance of a Web system and that will also support creativity.

# Evolution of Web Engineering

- Web Engineering is progressively emerging as a new discipline addressing the unique needs and challenges of Web-based systems development.

- 1998, when the First Workshop on Web Engineering was held in Brisbane, Australia, in conjunction with the World Wide Web Conference (WWW7)

- Initially two dedicated journals were, Journal of Web Engineering (www.rintonpress.com/journals/jweonline.html) and Journal of Web Engineering and Technology (www.inderscience.com),

- An edited book, Web Engineering: Managing Diversity and Complexity of Web Application Development (Murugesan & Deshpande, 2001).

# Web Based Systems

In the early days of the Web, we built systems using informality, urgency and intuition.

- Informality leads to an easy work environment—one in which you can do your own thing.

- Urgency leads to action and rapid decision making.

- Intuition is an intangible quality that enables you to "feel" your way through complex situations.

- Problem is—this approach can and often does lead to problems

# Web Application

The term Web application (WebApp) encompasses:

- everything from a simple Web page that might help a consumer compute an automobile lease payment to a comprehensive website that provides complete travel services for business people and vacationers.

- Included within this category are complete websites, specialized functionality within websites, and information-processing applications that reside on the Internet or on an Intranet or Extranet.

- Difference between internet / intranet / extranet?

# WebApp Attributes

- Concurrency

- Unpredictable load

- Performance

- Availability

- Data driven

- Security

- Content sensitive

- Continuous evolution

# WebApp Types / Categories

- Informational

- Interactive

- Transactional

- Workflow Oriented

- Collaborative work environments

- Online Communities

# Categories of Web Application

| Functionality/Category | Examples |
|---|---|
| Informational | Online newspapers, product catalogues, newsletters, manuals, reports, online classifieds, online books |
| Interactive | Registration forms, customized information presentation, online games |
| Transactional | Online shopping (ordering goods and services), online banking, online airline reservation, online payment of bills |
| Workflow oriented | Online planning and scheduling, inventory management, status monitoring, supply chain management |
| Collaborative work environments | Distributed authoring systems, collaborative design tools |
| Online communities, marketplaces | Discussion groups, recommender systems, online marketplaces, e-malls (electronic shopping malls), online auctions, intermediaries |

*Categories of Web applications based on functionality*

# Why Web Engineering

As WebApps become larger and more complex,

- Informality remains, but some degree of requirements gathering and planning are necessary.

- Urgency remains, but it must be tempered by a recognition that decisions may have broad consequences

- Intuition remains, but it must be augmented by proven management and technical patterns

# Web Engineering

We can also define it in this way:

- an agile, yet disciplined framework for building industry- quality WebApps.

We must understand the meaning of:

- Agile
- Disciplined framework
- Industry quality

# Why Agility?

• Business strategies and rules change rapidly

• Management demands near-instantaneous responsiveness (even when such demands are completely unreasonable)

• Stakeholders often don't understand the consequences of the Web and keep changing their mind even as they demand rapid delivery

• An agile approach helps cope with this fluidity and uncertainty.

# What is an Agile Process?

Agile Web engineering combines a philosophy and a set of development guidelines. The philosophy encourages:

- customer satisfaction
- early incremental delivery of the WebApp
- small, highly motivated project teams
- informal methods
- minimal work products
- overall development simplicity

# What is an Agile Process?

- An agile process stresses delivery over analysis and design (although these activities are not discouraged), and active and continuous communication between developers and customers.

# Underlying Agility Principles - I

• Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.

• Welcome changing requirements, even late in development.

• Deliver working software increments frequently, from as often as every few days to every few months, with a preference to the shorter timescales.

• Business people and developers must work together daily throughout the project.

• Build projects around motivated people. Give them the environment and support they need, and trust them to get the job done. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
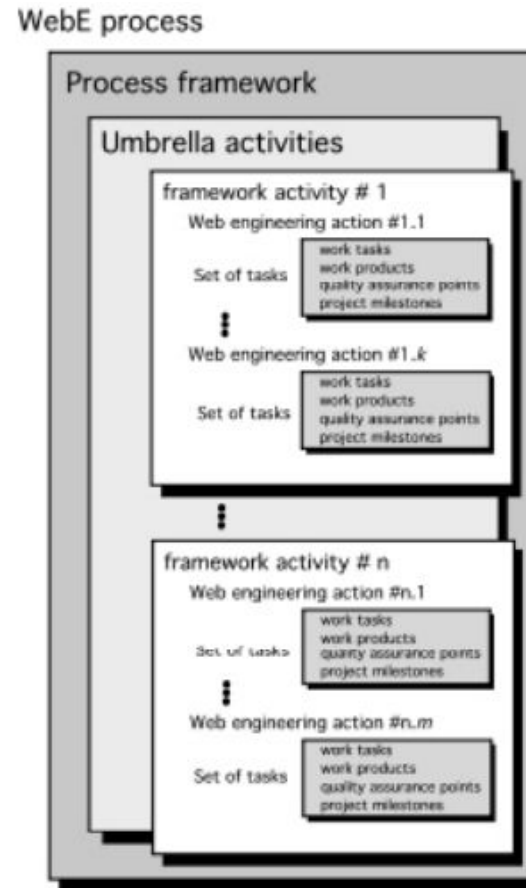
# What is a WebE Framework?

A framework is a set of activities that will always be performed for every Web engineering project – though the nature of the activities might vary to suit the project.

Each framework activity is composed of a set of actions

- Actions encompass
  - work tasks
  - work products
  - quality assurance points
  - project milestones

# A Generic Framework

# The WebE Framework: Activities

• Communication. Involves heavy interaction and collaboration with the customer (and other stakeholders) and encompasses requirements gathering and other related activities.

• Planning. Establishes an incremental plan for the WebE work.

• Modeling. Encompasses the creation of models that assist the developer and the customer to better understand WebApp requirements and the design

• Construction. Combines both the generation of HTML, XML, PHP, and similar code with testing that is required to uncover errors in the code.

• Deployment. Delivers a WebApp increment to the customer who evaluates it and provides feedback based on the evaluation.

# WebE Best Practices

• Take the time to understand business needs and product objectives, even if the details of the WebApp are vague.

• Describe how users will interact with the WebApp using a scenario-based approach.

• Always develop a project plan, even if it's very brief.

• Spend some time modelling what it is that you're going to build.

• Review the models for consistency and quality.

• Use tools and technology that enable you to construct the system with as many reusable components as possible.

• Don't reinvent when you can reuse.

• Don't rely on early users to debug the WebApp—design and use comprehensive tests before releasing the system.

# Thanks. Any Questions?