# METHODS OF DEVELOPMENT OF EDUCATIONAL MATERIALS FOR DISTANCE LEARNING IN THE FIELDS WHERE CHANGES HAPPEN MOST RAPIDLY

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Abstract. The article presents the methodology for constructing the "WEB-technology" course in the European Commission's Program "Erasmus +" project, the content of which can be quickly adapted in accordance with changes in WEB-programming technologies.

When I was a student and learned to work on large IBM 360 computers (PC's were rare back then) the movie "Back To The Future, Part II" was released, where the characters got to 2015. Today we can see that practically none of those estimates came true – people do not fly with hover boards, there are no flying cars (we drive cars with internal combustion engines just as in the times of Henry Ford), housewives still cook on kitchen stoves. The only field where the movie makers' hopes were not disgraced is the field of communication: in the movie the characters get information immediately and speak via videophone, and this estimate came true in 2015. Thus, IT and WWW are the forefront of scientific and technological progress, it is a breakthrough area. This is the thing that changed our lives, our daily routine, our habits most significantly over the last 30 years.

The World-Wide Web technologies which were originally designed in CERN (European Organization for Nuclear Research) as a means of delivering documents from one scientific establishment to another one are now used as a platform for complex interactive applications which slowly but steadily drive out installable applications.

This process is facilitated with the advantages that WEB applications have:
- anytime access from different devices,
- automatic updating,
- a possibility of integration of different applications written for different platforms

However creating WEB applications requires a bit different approaches than creating traditional installable applications and is for the moment impossible without integrating a wide variety of approaches and technologies.

Our course WEB-technologies, developed as part of European Commission's Program "Erasmus +" project, introduces to these different WWW technologies and gives experience in creating WEB applications. Students learn theoretically and get practical skills in markup languages, scripting languages, network protocols, graphics and video-images, event-driven programming, object oriented programming, databases.

That is, those technologies which allow constructing modern WEB applications.

There is a difficulty with selecting technologies of WEB programming, because this is the field where changes happen most rapidly. In his book "Business @ the Speed of Thought" Bill Gates told that Microsoft updates these technologies almost completely once every 3 years. And the course has to be updated very often – those technologies which are mainframe today may lose their positions within a year.

We have found the following way out.

Although changes in the field of WEB-technologies are happening very rapidly, something remains relatively stable – programming concepts and application architecture.

This is why while answering the question what is more important, knowledge or understanding, we expressly decide for understanding.

We follow the principle that understanding of concepts and architecture is more important than specific methods of coding which may undergo changes faster than we would like them to.

The architecture of a WEB application - immutable part - includes the following component parts:
- application interface in a Web Browser (Front End or Presentation Layer)
- server end (Back End or Business Layer)
- data storage system (Data Layer)

The immutable part is filled with fast-changing content. Today it is:
- HTML/CSS/JavaScript and Document object Model (DOM) - Document structure Browser software, as well as concepts of Model View Controller, Single page applications (Angular JS and Vue.JS frameworks) are studied at the interface level (Presentation Layer)
- The ASP.NET technology based on C# and VB.NET is studied at the server level (Business Layer).
- The ADO.NET technology for interoperating with databases is studied at the data level (Data Layer).

Such a selection is conditioned by the fact that today ASP.NET performs faster than any popular WEB framework.

If the situation changes in a year or two and Node.js outperforms ASP.NET in speed or popularity, then we will possibly learn Node.js at the server level.

But in the meantime we present you the thing which we find the best and the most useful for students for today.

### Literature
1. WEB-technologies. Yaroshevich A.O. [Electronic resource] - Access mode: http://sbcde.by/course/view.php?id=278.