A Project Report
on
Department Information System

Bachelor of Technology

IN

COMPUTER ENGINEERING

BY

Priyanshu Verma
Enrolment number: GH5297

Rishabh Kumar Varshney
Enrolment number: GH0517

Under the Guidance of

Prof. M Sarosh Umar
Department Of Computer Engineering

Zakir Husain College of Engineering & Technology
Aligarh Muslim University
Aligarh (India)-202002

2017-2018

Dated 30 Nov 2017

Declaration

The work presented in project entitle “Project Title” submitted to the Department of Computer Engineering, Zakir Husain College of Engineering and Technology, Aligarh Muslim University Aligarh, for the award of the degree of Bachelor of Technology in Computer Engineering, during the session 2017-18, is my original work. I have neither plagiarized nor submitted the same work for the award of any degree.

Date: 25 Nov 2017 (Signature)
Place: Dept Of Computer Engg Priyanshu Verma

(Signature)
Rishabh Kumar Varshney

Dated 30 Nov 2017

Certificate

This is to certify that the Project Report entitled “Department Information System”, being submitted by “Priyanshu Verma” and “Rishabh Kumar Varshney”, in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology in Computer Engineering, during the session 2017-18, in the Department of Computer Engineering, Zakir Husain College of Engineering and Technology, Aligarh Muslim University Aligarh, is a record of candidate’s own work carried out by him under my (our) supervision and guidance.

Dr. Sarosh Umar
Chairman
Department of Computer Engineering
ZHCET, AMU, Aligarh

ACKNOWLEDGEMENT

Every project big or small is successful largely due to the effort of a number of wonderful people who always given their valuable advice or lent a helping hand. At this juncture we feel deeply honored in expressing our sincere thanks to Prof. Sarosh Umar Sir for making the resources available at right time and providing valuable insights leading to the successful completion of our project. We sincerely appreciate the inspiration; support and guidance of all those people who have been instrumental in making this project a success.

It is our pleasant duty to offer sincere acknowledgement to all honorable personalities of the department including technical staff, lab staff and library staffs who also has been a constant source of help and encouragement in carrying out this project.

Priyanshu Verma & Rishabh Kumar Varshney
B.Tech, 5th Semester

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ABSTRACT:

The Department Of Petroleum Studies is facing issues in some activities related to management of the department information causing delays in essential functioning of the department. This software deals with the huge data and records of the department and groups them in a well-defined and accessible manner making the data management related tasks simpler. It connects teacher's information of the department to master database. It divides the workload of the department members according to their roles. It helps the department members to do their tasks online increasing the work efficiency and reducing the delays in the tasks.

It allows each faculty member to update its own information which will ease the work of the administrator. It will serve as a useful tool in providing the reports for the Review and Quality Assurance teams such as NBA and NAAC.
It can also be a very effective and secured system to store the information.

This paper presents a complete web based software. The software is built by using Entity Framework. The technology used is ASP.NET MVC. The programming language is C#. The project is tested online. The Software can be accessed from the link department.azurewebsites.net

1. INTRODUCTION TO PROJECT

1.1 Introduction

The software deals with a web based system to keep the latest information of the members of the department in a master database of the department.
It also groups the database to particular categories to increase its accessibility. It also helps to maintain the workload of employees of the department.

1.2 Goals of the Project

- **Information:** To provide complete and instant information of the faculty members on a single click.
- **Distribute work load:** To reduce work load on administrator.
- **User Friendliness:** To develop a software with user friendly interface and easy to read displays.

1.3 Highlights of The Project

- **Access Information: Users can view the information of the faculty of the department.**
- **Secure: Methods are adopted to make this web based software as secure as possible to prevent malicious activities.**
- **Publications: Work load for managing publications is optimized.**
- **Role Based Authentication**
- **Email Verification**
- **Linked Structure**
- **Notices**

2. ORGANIZATIONAL OVERVIEW

2.1 Purpose of the Project

The department is facing issues in some activities related to management of
the department information while the reports are required for the Review and Quality Assurance teams such as NBA and NAAC.
So, to solve this issue with the department this web based software is developed resolving information related issues in the department

2.2 Working of the Project

This software will be accessed by three categories name administrator, faculty and guest users. The access to this software will be limited according to the given categories and has been implemented by using role based authentication.
The administrator will be the super user and will be able to have all permissions.
The teachers can access some information and can edit their own information.
The guest users can access the limited information about the faculty such as view notices and information of teachers.

3.DESIGN SECTION

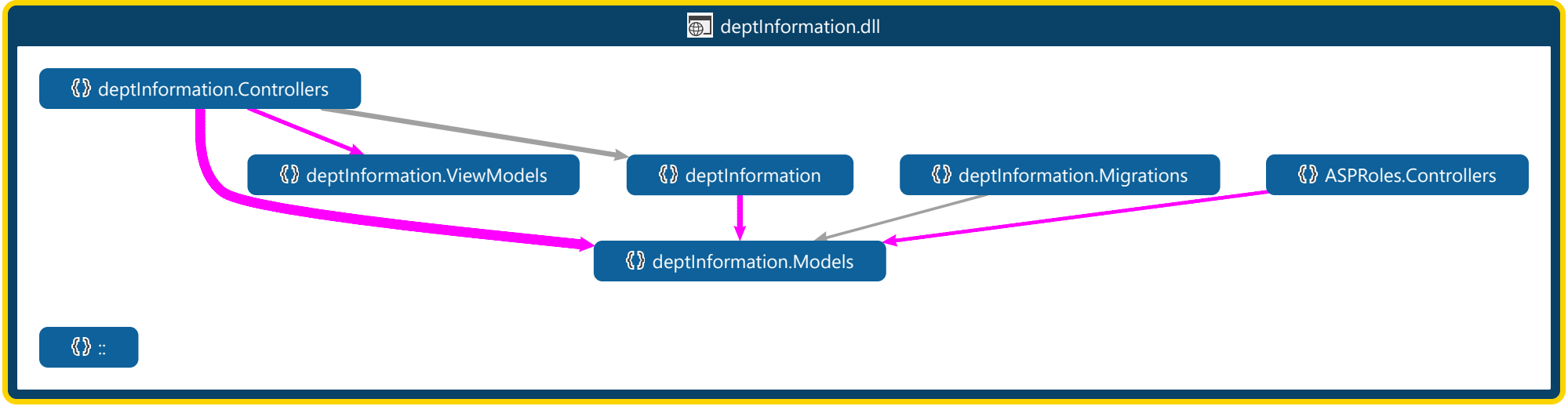
3.1 System Architecture

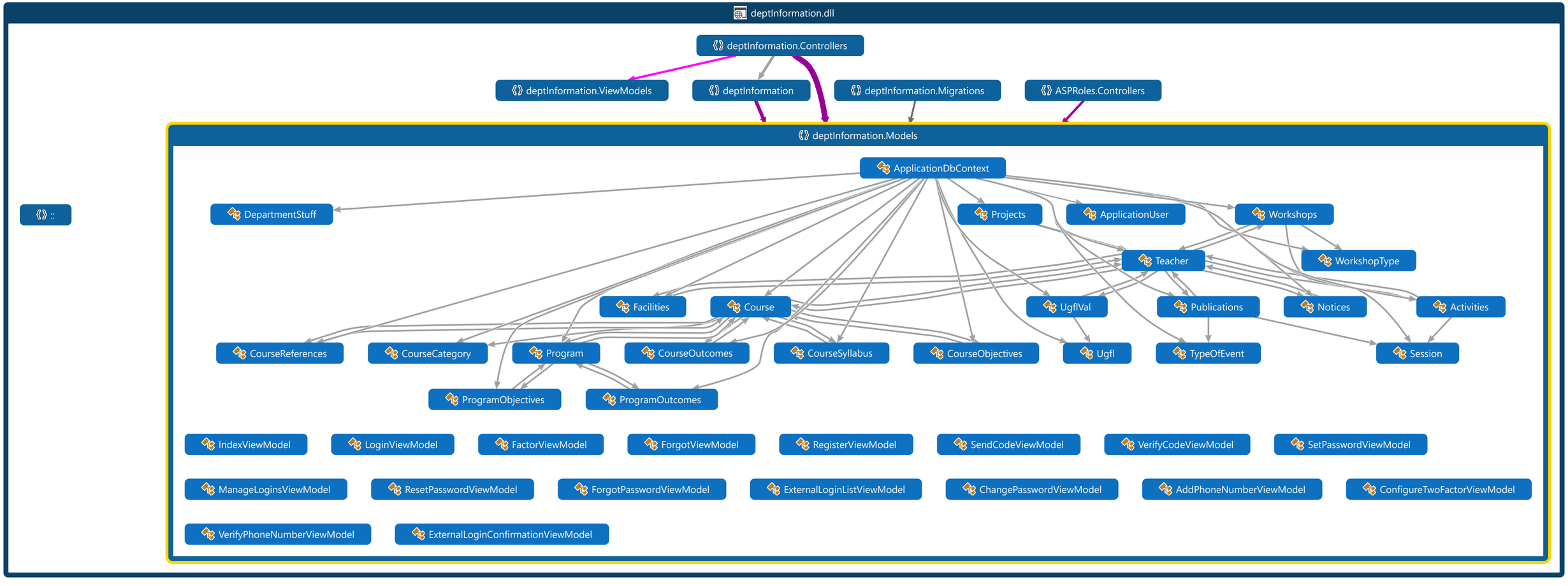
3.2 Class Diagrams

3.3 ER Diagrams

3.4 Sequence Diagrams

System Architecture

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deptInformation.Controllers
deptInformation.ViewModels
deptInformation
deptInformation.Migrations
ASPRoles.Controllers
deptInformation.Models
::
ApplicationDbContext
DepartmentStuff
Projects
ApplicationUser
Workshops
Teacher
WorkshopType
Facilities
Course
UgflVal
Publications
Notices
Activities
CourseReferences
CourseCategory
Program
CourseOutcomes
CourseSyllabus
CourseObjectives
Ugfl
TypeOfEvent
Session
ProgramObjectives
ProgramOutcomes
IndexViewModel
LoginViewModel
FactorViewModel
ForgotViewModel
RegisterViewModel
SendCodeViewModel
VerifyCodeViewModel
SetPasswordViewModel
ManageLoginsViewModel
ResetPasswordViewModel
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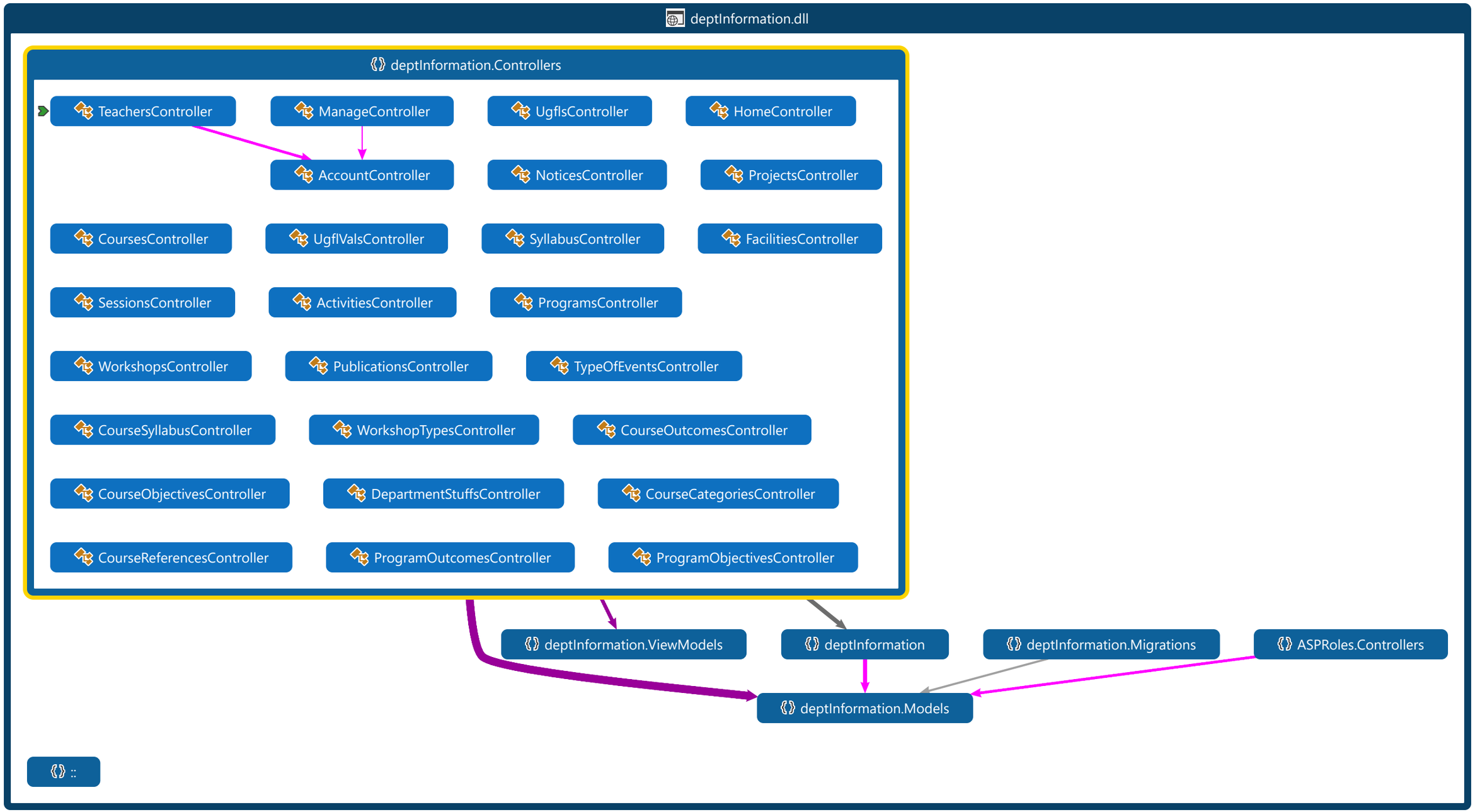
ConfigureTwoFactorViewModel
VerifyPhoneNumberViewModel
ExternalLoginConfirmationViewModel


deptInformation.dll
deptInformation.Controllers
TeachersController
ManageController
UgflsController
HomeController
AccountController
NoticesController
ProjectsController
CoursesController
UgflValsController
SyllabusController
FacilitiesController
SessionsController
ActivitiesController
ProgramsController
WorkshopsController
PublicationsController
TypeOfEventsController
CourseSyllabusController
WorkshopTypesController
CourseOutcomesController
CourseObjectivesController
DepartmentStuffsController
CourseCategoriesController
CourseReferencesController
ProgramOutcomesController
ProgramObjectivesController
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ASPRoles.Controllers
deptInformation.Models
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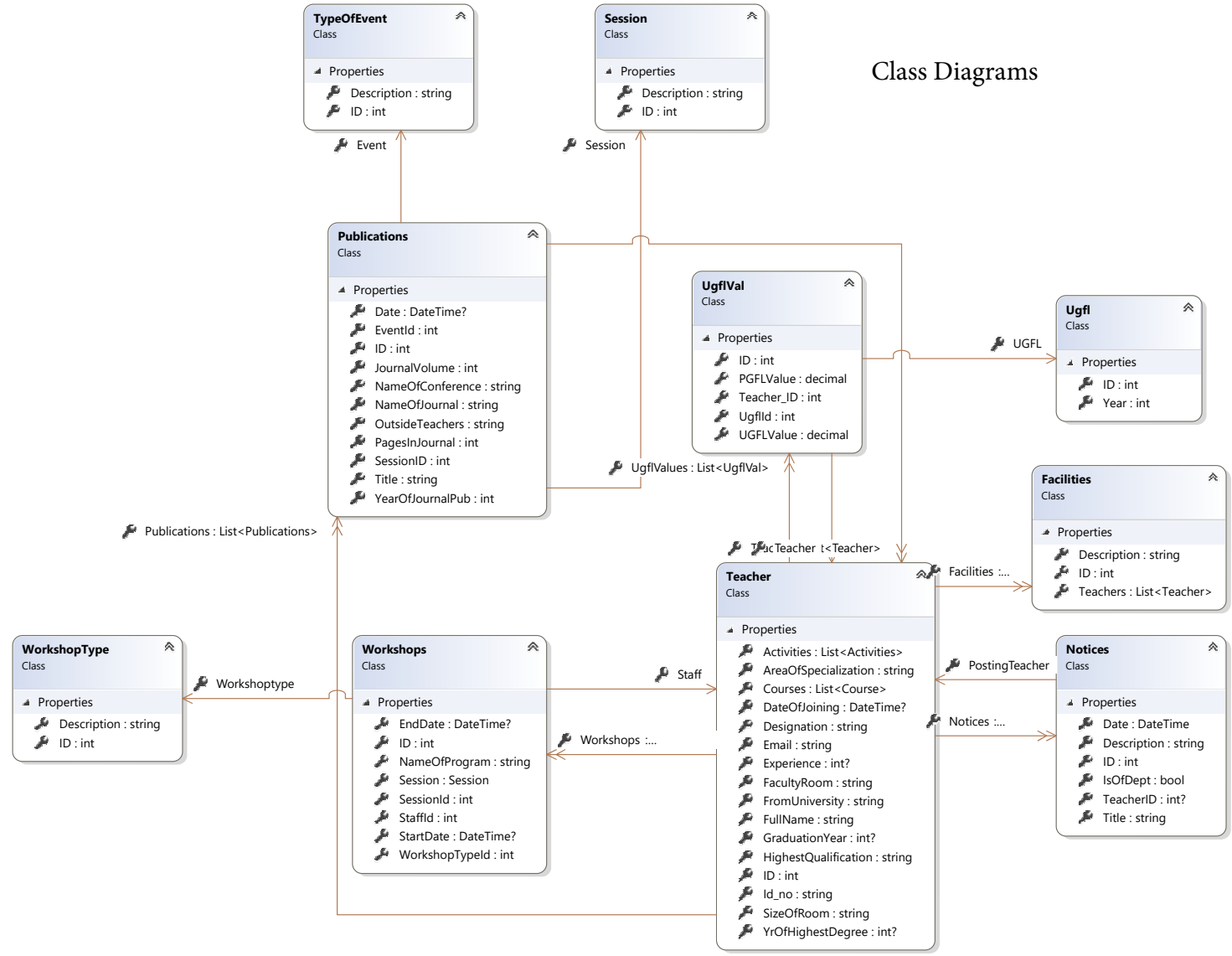
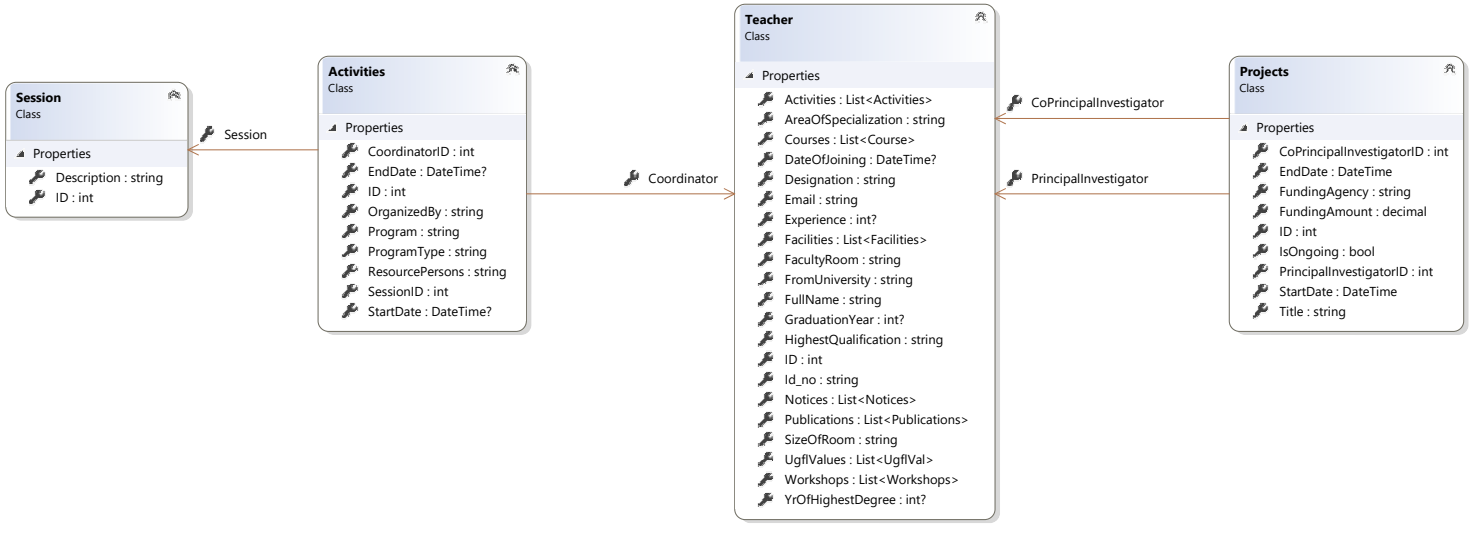
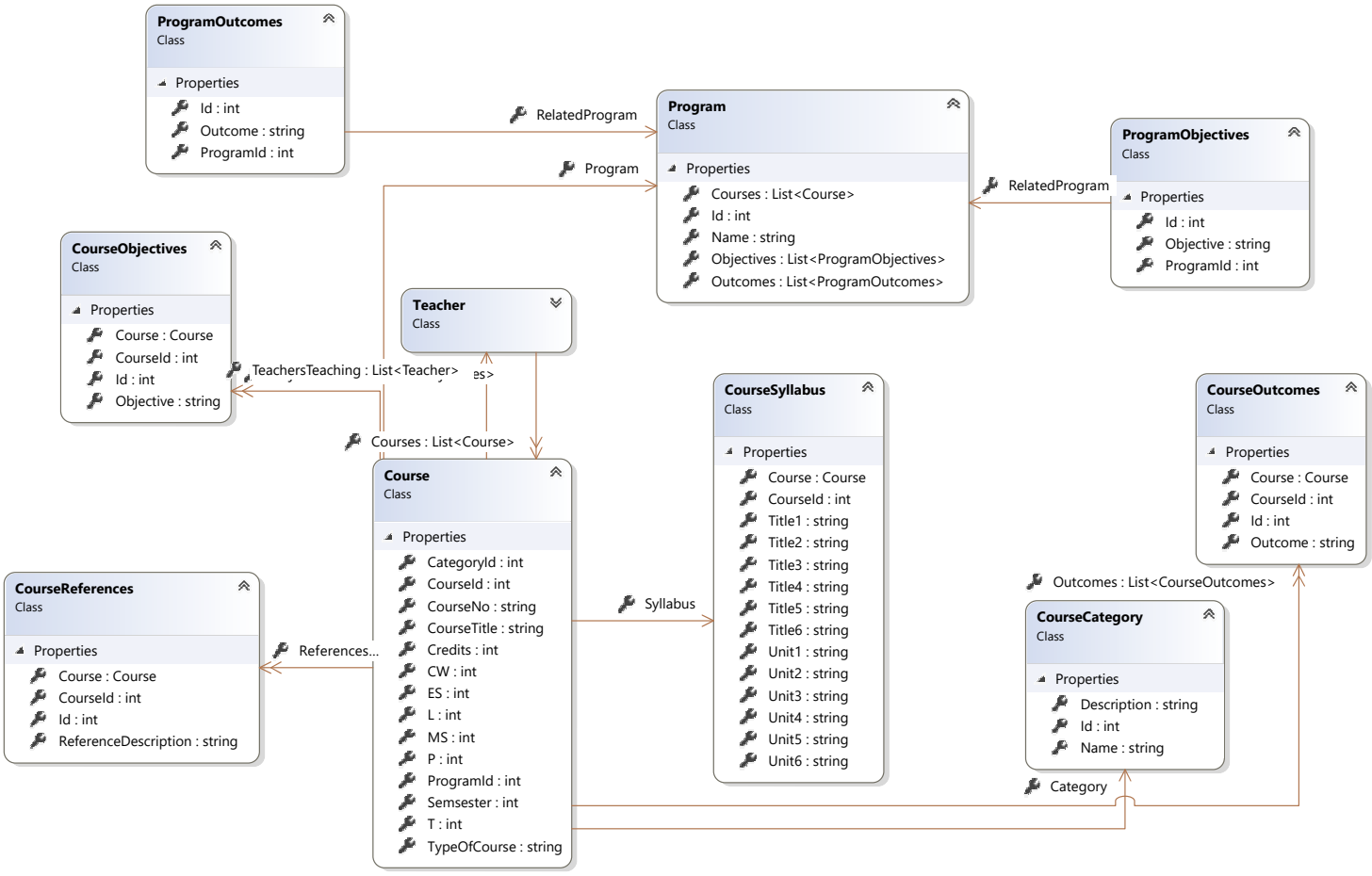
Class Diagrams






ProgramOutcomes
Class
Properties
Id : int
Outcome : string
ProgramId : int
RelatedProgram
Program
Class
Properties
Courses : List<Course>
Id : int
Name : string
Objectives : List<ProgramObjectives>
Outcomes : List<ProgramOutcomes>
Program
RelatedProgram
ProgramObjectives
Class
Properties
Id : int
Objective : string
ProgramId : int
CourseObjectives
Class
Properties
Course : Course
CourseId : int
Id : int
Objective : string
Teacher
Class
TeachersTeaching : List<Teacher>
Courses : List<Course>
Course
Class
Properties
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Credits : int
CW : int
ES : int
L : int
MS : int
P : int
ProgramId : int
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T : int
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Class
Properties
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Unit2 : string
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Unit4 : string
Unit5 : string
Unit6 : string
Syllabus
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Id : int
Outcome : string
Outcomes : List<CourseOutcomes>
CourseCategory
Class
Properties
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Category
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Class
Properties
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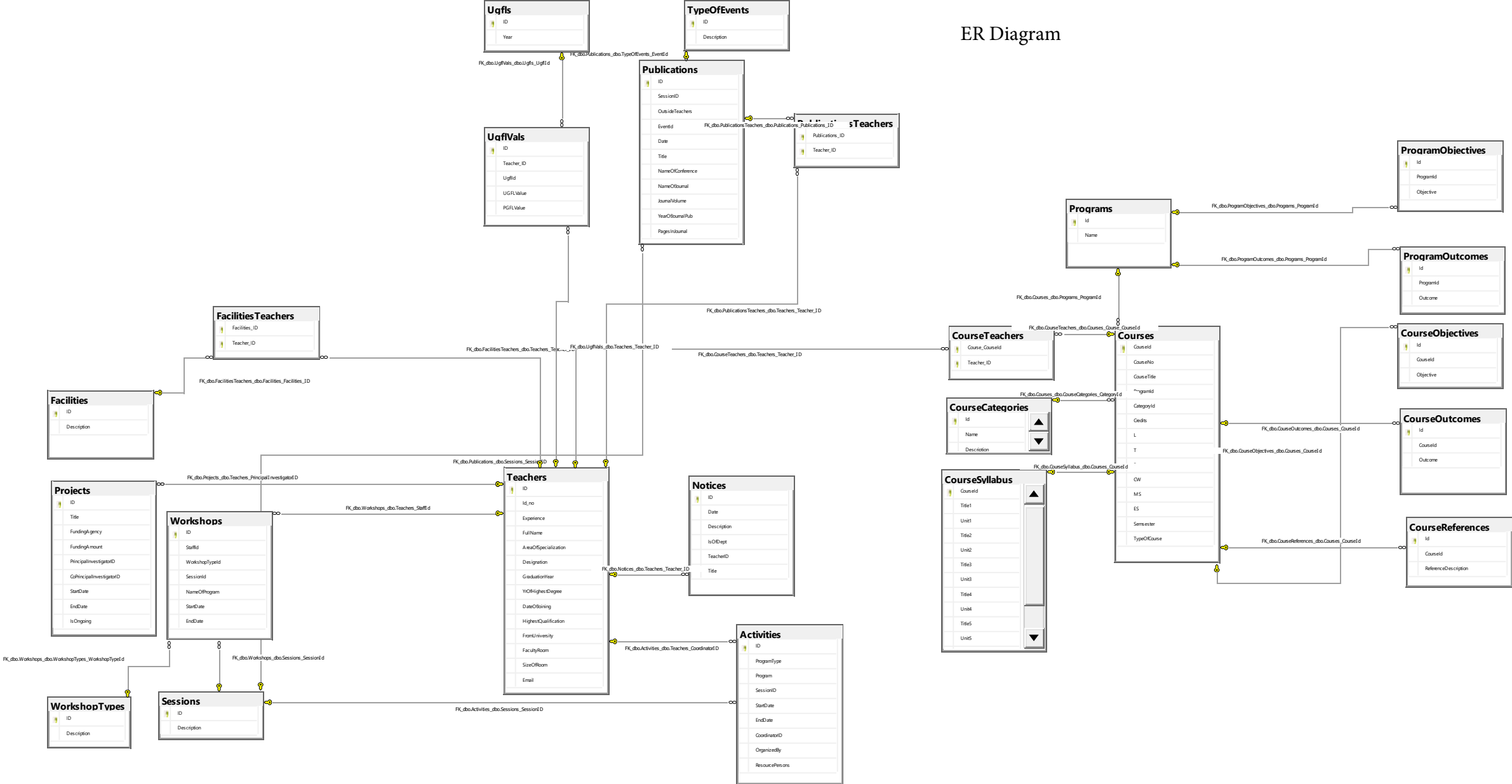
Id : int
ReferenceDescription : string
References...

ER Diagram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Programs
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CourseId
CourseNo
CourseTitle
ProgramId
CategoryId
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L
T
P
CW
MS
ES
Semester
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CourseObjectives
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Objective
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Description
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Title3
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Facilities
ID
Description
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FundingAgency
FundingAmount
PrincipalInvestigatorID
CoPrincipalInvestigatorID
StartDate
EndDate
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NameOfProgram
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YrOfHighestDegree
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FromUniversity
FacultyRoom
SizeOfRoom
Email
Notices
ID
Date
Description
IsOfDept
TeacherID
Title
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Activities
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Program
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EndDate
CoordinatorID
OrganizedBy
ResourcePersons
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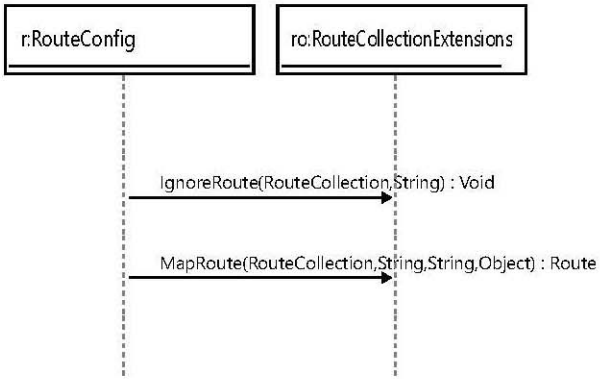
WorkshopTypes
ID
Description
Sessions
ID
Description
FK_dbo.Activities_dbo.Sessions_SessionID

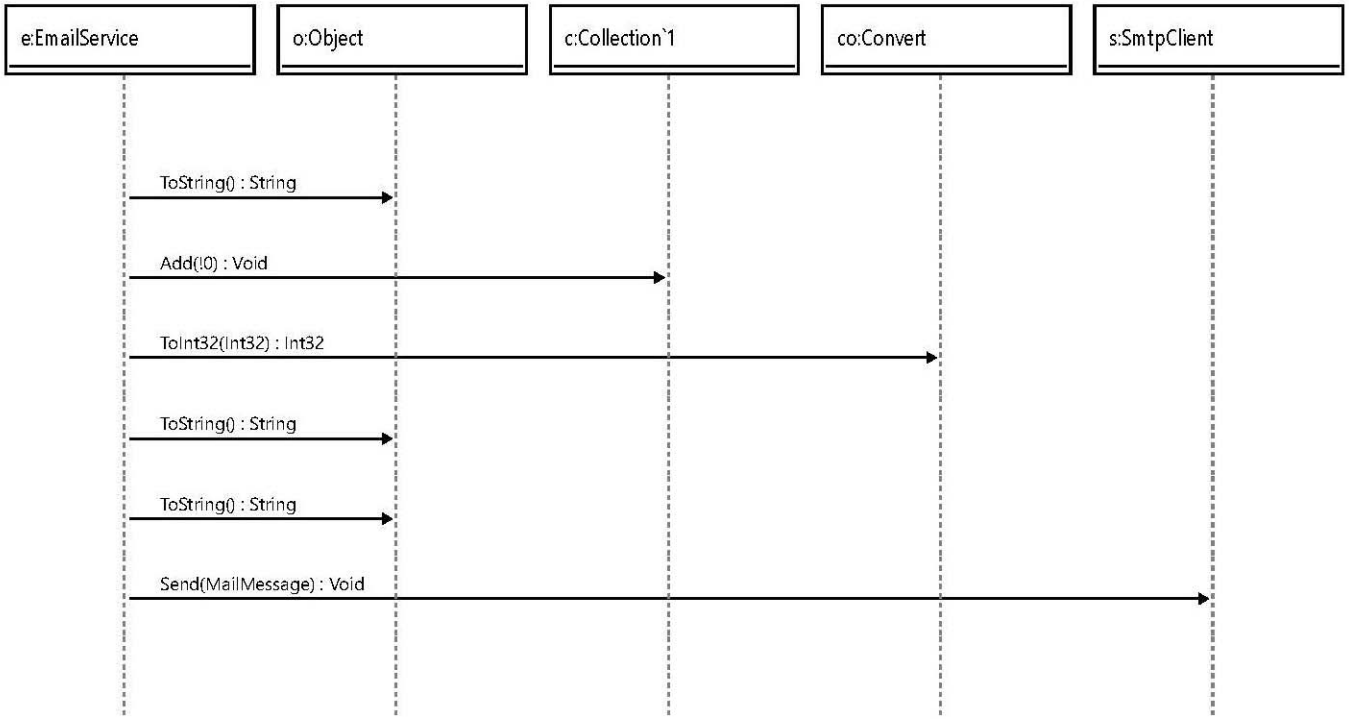
Startup


m:MvcApplication
a:AreaRegistration
f:FilterConfig
g:GlobalFilterCollection
r:RouteConfig
ro:RouteCollectionExtensions
b:BundleConfig
bu:Bundle
bu:BundleCollection
RegisterAllAreas() : Void
RegisterGlobalFilters(GlobalFilterCollection) : Void
Add(Object) : Void
RegisterRoutes(RouteCollection) : Void
IgnoreRoute(RouteCollection,String) : Void
MapRoute(RouteCollection,String,String,Object) : Route
RegisterBundles(BundleCollection) : Void
Include(String,IItemTransform[]) : Bundle
Add(Bundle) : Void
Include(String,IItemTransform[]) : Bundle
Add(Bundle) : Void
Include(String,IItemTransform[]) : Bundle
Add(Bundle) : Void
Include(String[]) : Bundle
Add(Bundle) : Void
Include(String[]) : Bundle
Add(Bundle) : Void
Include(String,IItemTransform[]) : Bundle
Add(Bundle) : Void
Include(String,IItemTransform[]) : Bundle
Add(Bundle) : Void
Include(String,IItemTransform[]) : Bundle
Add(Bundle) : Void

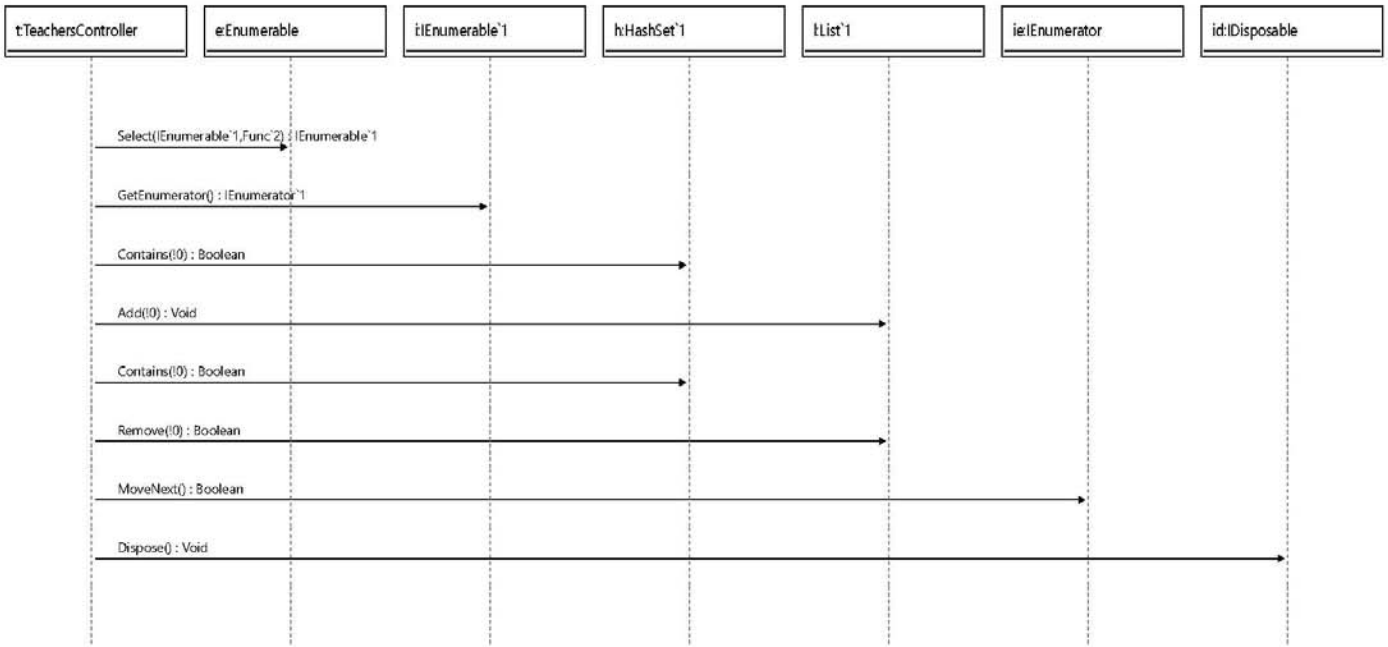
Route


r:RouteConfig
ro:RouteCollectionExtensions
IgnoreRoute(RouteCollection,String) : Void
MapRoute(RouteCollection,String,String,Object) : Route

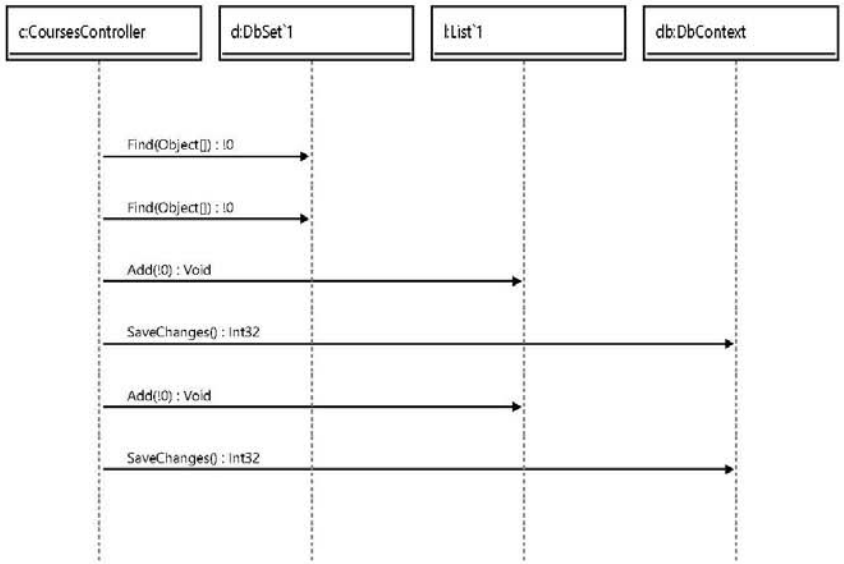
Email


e:EmailService
o:Object
c:Collection`1
co:Convert
s:SmtpClient
ToString() : String
Add(!0) : Void
ToInt32(Int32) : Int32
ToString() : String
ToString() : String
Send(MailMessage) : Void

Update Facilities



Add Instructor



4.CODING SECTION

4.1 RouteConfig.cs File

```
namespace deptInformation
{
    public class RouteConfig
    {
        public static void RegisterRoutes(RouteCollection routes)
        {
            routes.IgnoreRoute("{resource}.axd/{*pathInfo}");

            routes.MapRoute(
                name: "Default",
                url: "{controller}/{action}/{id}",
                defaults: new { controller = "Home", action = "Index", id = UrlParameter.Optional }
            );
        }
    }
}
```

4.2 Code of a View Using Razor

```
<div>
    <h4>Teacher</h4>
    <hr />
    <dl class="dl-horizontal">
        <dt>
            @Html.DisplayNameFor(model => model.Id_no)
        </dt>

        <dd>
            @Html.DisplayFor(model => model.Id_no)
        </dd>

        <dt>
            @Html.DisplayNameFor(model => model.Email)
        </dt>

        <dd>
            @Html.DisplayFor(model => model.Email)
        </dd>

        <dt>
            @Html.DisplayNameFor(model => model.FullName)
        </dt>

        <dd>
            @Html.DisplayFor(model => model.FullName)
        </dd>
```

4.3 Migration File

```
public partial class noticesModify : DbMigration
{
    public override void Up()
    {
        RenameColumn(table: "dbo.Notices", name: "Teacher_ID", newName: "TeacherID");
        RenameIndex(table: "dbo.Notices", name: "IX_Teacher_ID", newName: "IX_TeacherID");
    }

    public override void Down()
    {
        RenameIndex(table: "dbo.Notices", name: "IX_TeacherID", newName: "IX_Teacher_ID");
        RenameColumn(table: "dbo.Notices", name: "TeacherID", newName: "Teacher_ID");
    }
}
}
```

4.4 Code of a Controller

```
private ApplicationDbContext db = new ApplicationDbContext();

// GET: Courses
public async Task<ActionResult> Index()
{
    var courses = db.Courses.Include(c => c.Category).Include(c => c.Program).Include(c => c.Syllabus);
    return View(await courses.ToListAsync());
}

// GET: Courses/Details/5
public async Task<ActionResult> Details(int? id)
{
    if (id == null)
    {
        return new HttpStatusCodeResult(HttpStatusCode.BadRequest);
    }
    Course course = await db.Courses.FindAsync(id);
    if (course == null)
    {
        return HttpNotFound();
    }
    return View(course);
}
```

4.5 Code of a Model

```
namespace deptInformation.Models
{
    public class Facilities
    {

        [Key()]
        public int ID { get; set; }

        [Required]
        [StringLength(500, MinimumLength = 5)]
        [Display(Name = "Facility Name")]
        public string Description { get; set; }

        public virtual List<Teacher> Teachers { get; set; }
    }
}
```

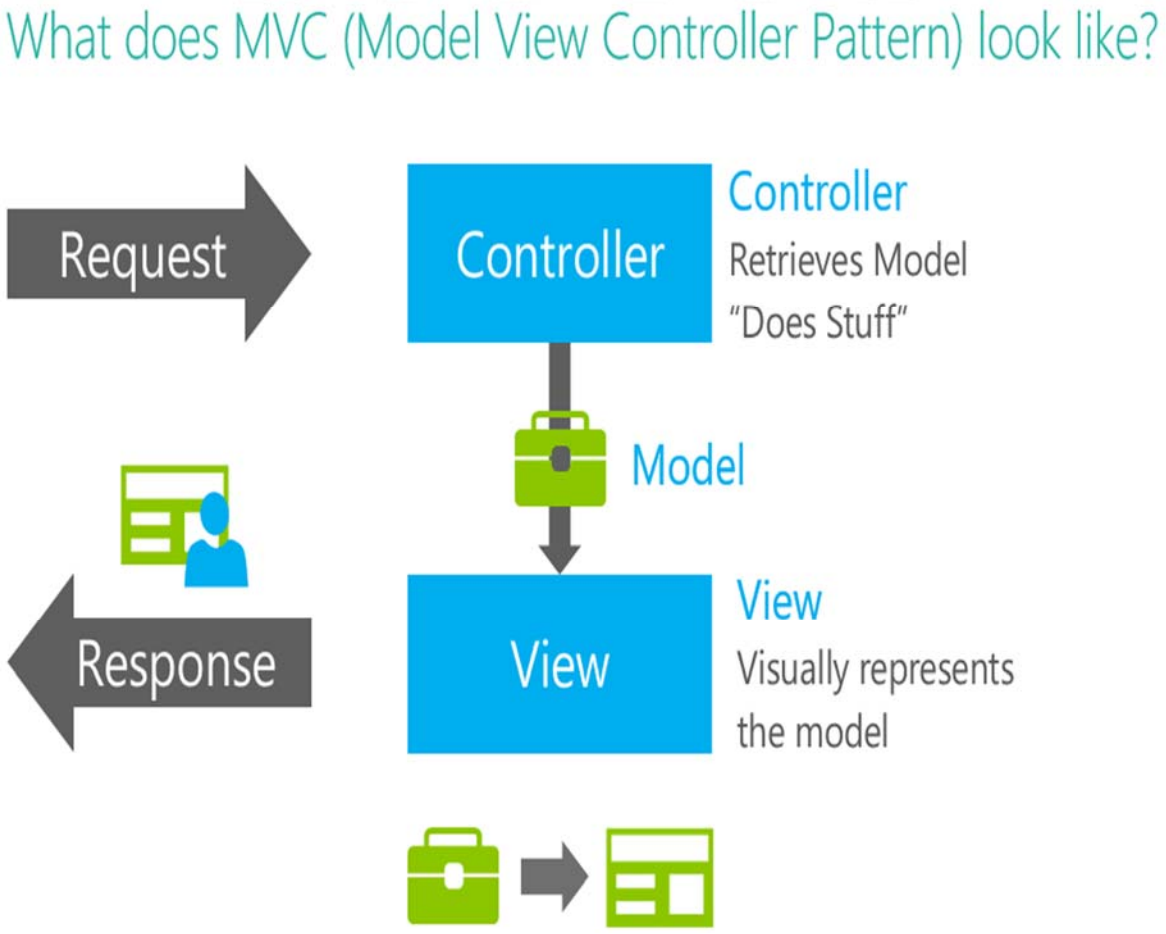
4.6 BundleConfig.cs

```
public class BundleConfig
{
    // For more information on bundling, visit https://go.microsoft.com/fwlink/?LinkId=301862
    public static void RegisterBundles(BundleCollection bundles)
    {
        bundles.Add(new ScriptBundle("~/bundles/jquery").Include(
                    "~/Scripts/jquery-{version}.js"));

        bundles.Add(new ScriptBundle("~/bundles/jqueryval").Include(
                    "~/Scripts/jquery.validate*"));

        // Use the development version of Modernizr to develop with and learn from. Then, when you're
        // ready for production, use the build tool at https://modernizr.com to pick only the tests you need.
        bundles.Add(new ScriptBundle("~/bundles/modernizr").Include(
                    "~/Scripts/modernizr-*"));

        bundles.Add(new ScriptBundle("~/bundles/bootstrap").Include(
                  "~/Scripts/bootstrap.js",
                  "~/Scripts/respond.js"));

        bundles.Add(new StyleBundle("~/Content/css").Include(
                  "~/Content/bootstrap.css",
                  "~/Content/site.css"));

        bundles.Add(new ScriptBundle("~/bundles/jqueryui").Include(
                    "~/Scripts/jquery-ui-{version}.js"));
```

5. 1 TOOLS AND TECHNOLOGY USED

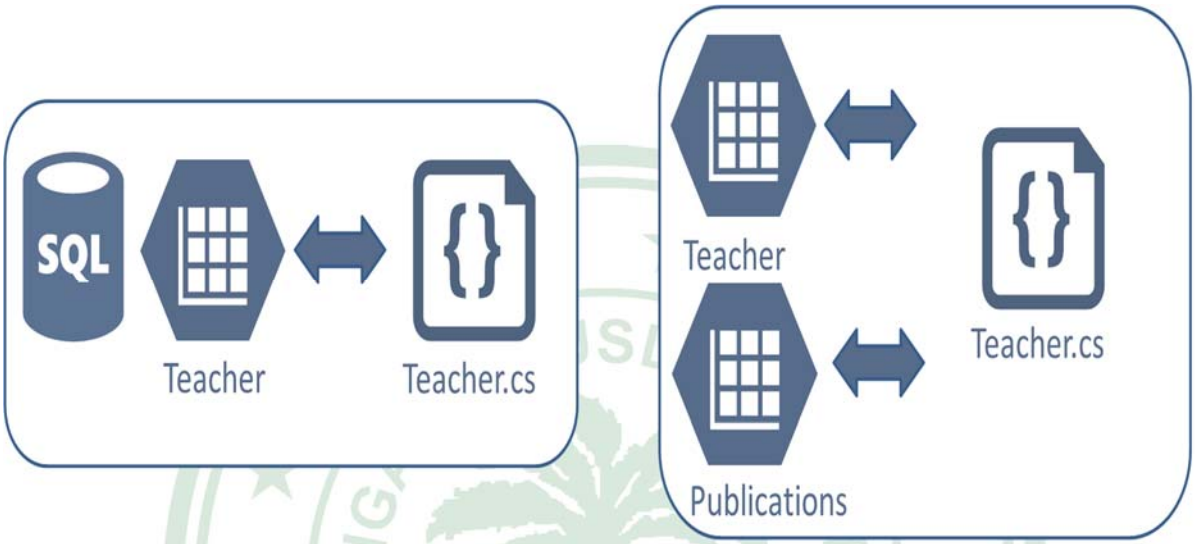
- **Technology: ASP.NET MVC**
- **Programming Language: C#**
- **Development Tools: Microsoft Visual Studio 2017**
- **Database: Microsoft SQL Server Database**
- **Testing URL: department.azurewebsites.net**
- **Hosting Platform: Microsoft Azure**

5.2 ABOUT TECHNOLOGY



What is Entity Framework

- It IS an ORM
- What's an ORM?
- Maps your database types to your code types
- Avoids repetitive data access code



Code First Migrations

- Code-First approach allows you to define model classes as per the Domain requirements via POCOs. Hence, you have complete control over the classes being written or Implemented.

Lazy Loading

- Lazy loading is a concept where we delay the loading of the object until the point where we need it. Putting in simple words, on demand object loading rather than loading objects unnecessarily.

Role Based Authentication

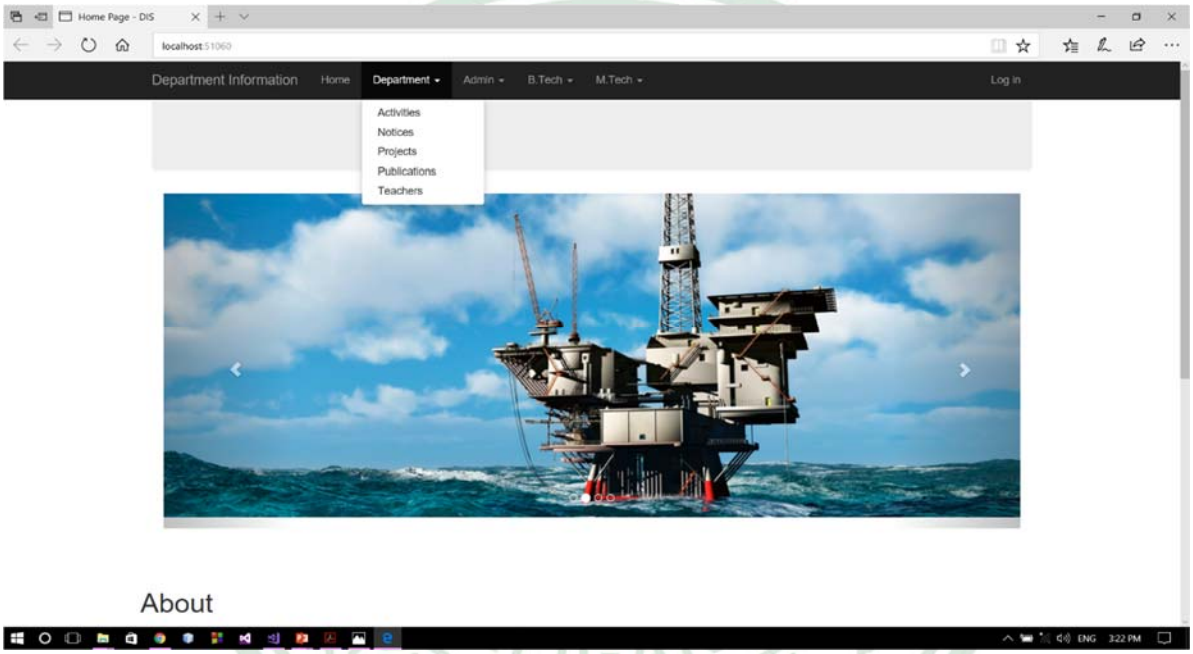
- ASP.NET Identity uses Roles based authentication which allows us to define Roles, Users and assign roles to users which helps us to manage Authorization.

Anti Forgery Token

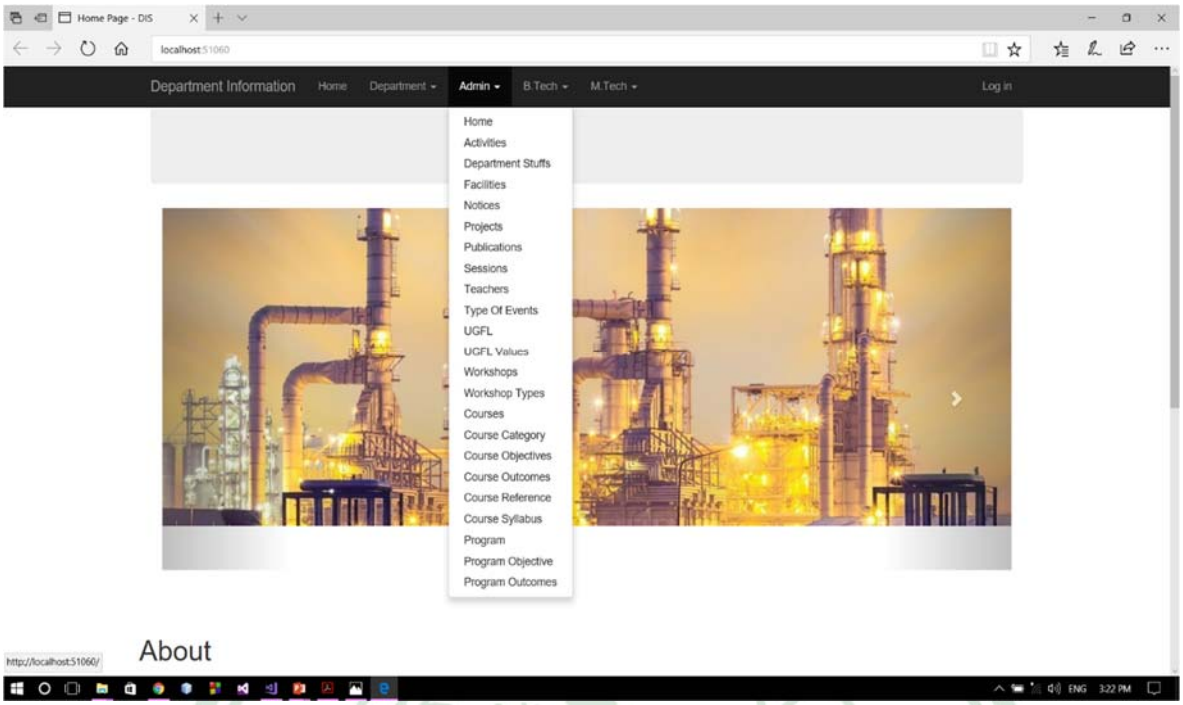
- This is to prevent a Cross-Site Request Forgery (CSRF).
- The token is both in the form and the cookie, if the form and cookie don't match we have a CSRF attack

6. PROJECT SNAPSHOTS

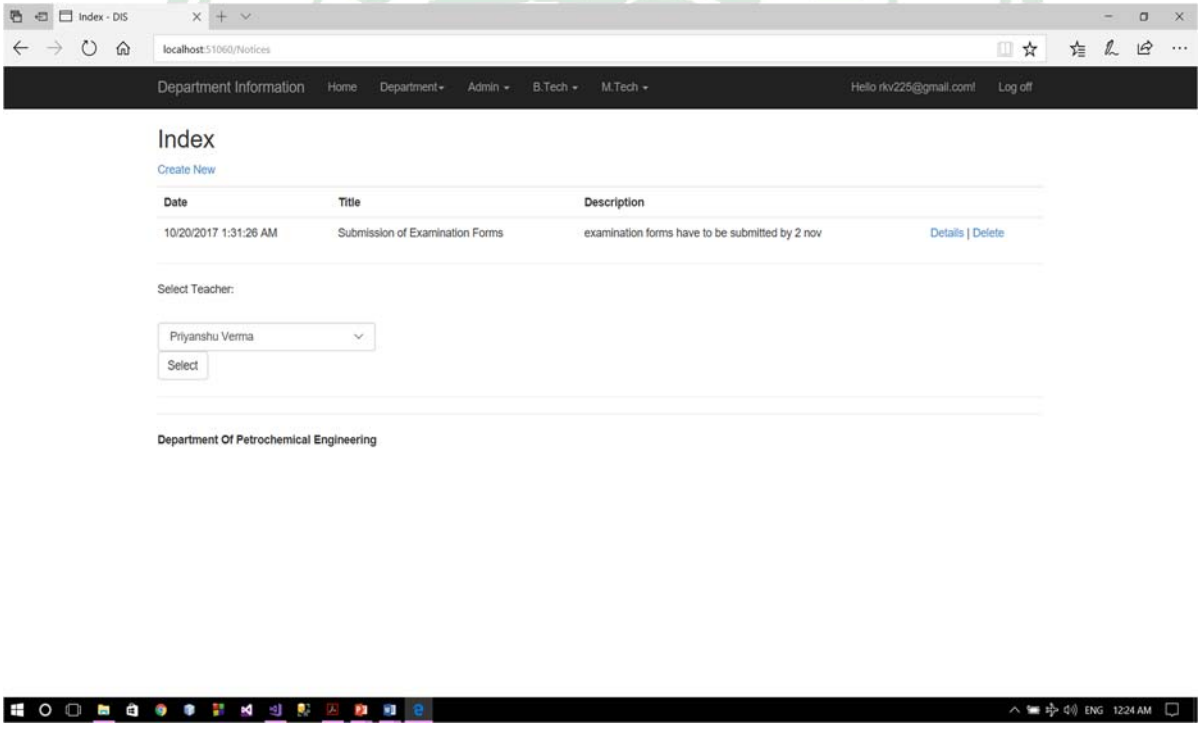
Home view (Department Menu)



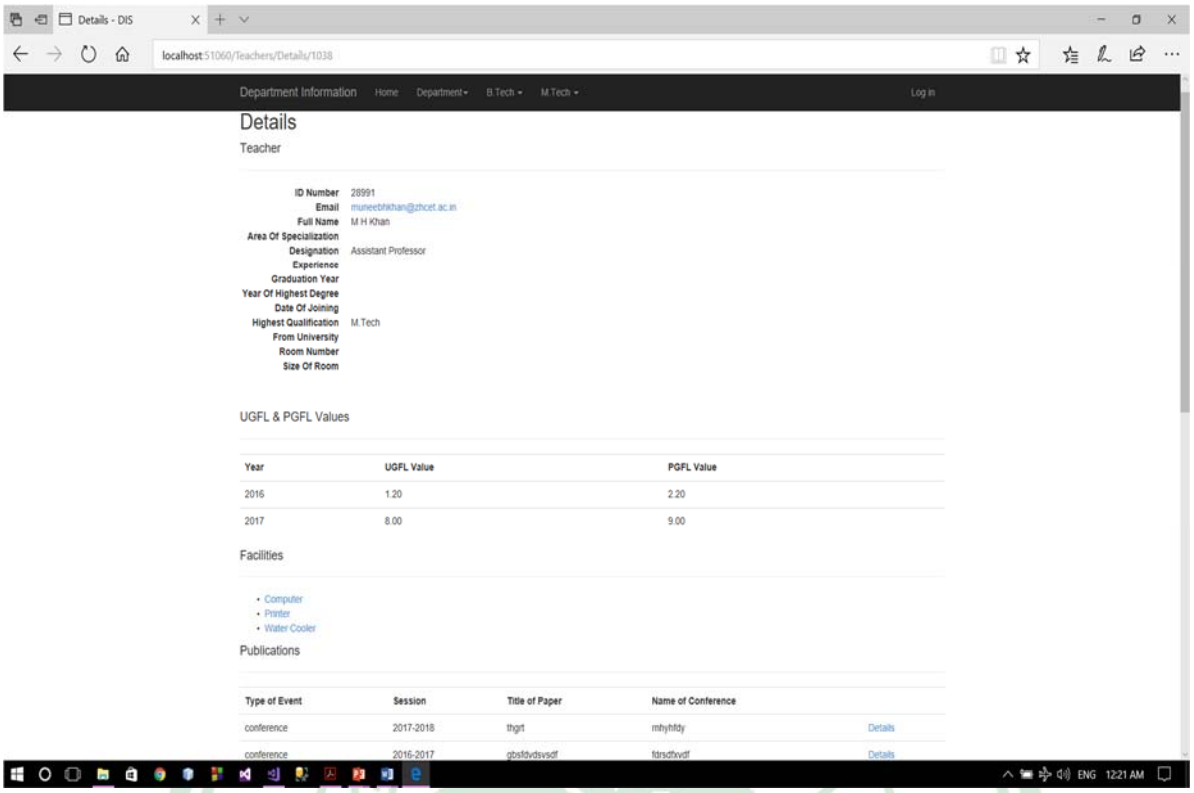
Home view (Administrator Menu)



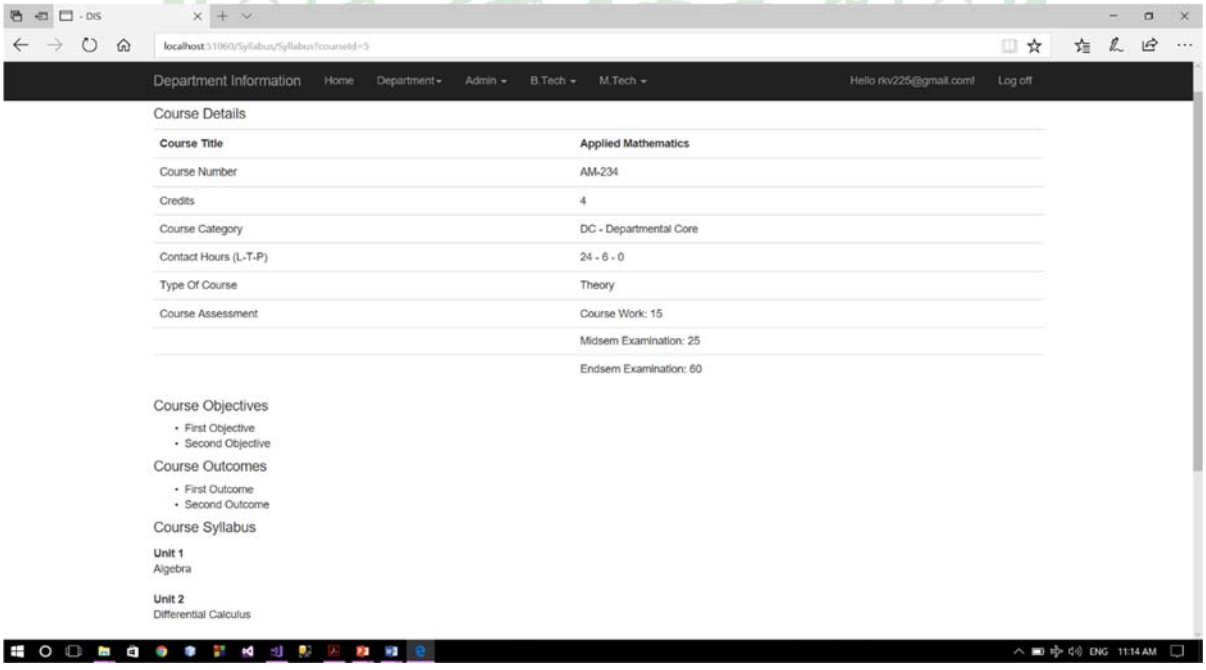
Notices Page



Faculty Details Page



Syllabus Page (B.Tech)



7.CONCLUSION

Department Information System is a web based software developed according to client requirements managing information of the department. Lot of efforts were put to make it complete and efficient. The application was tested with various inputs and the results were obtained as expected.

We faced minor hurdles from time to time but with use of references we were able to overcome them. We encountered and overcame major challenges in this project like hosting this software to Azure etc.

During our implementation of this application, we realized that Microsoft Visual Studio 2017 is a comprehensive ASP.NET based software development tool and Microsoft SQL Server Database is an extremely useful for managing database locally on a development machine.

Through the development of this Software, we have gained a working knowledge on ASP.NET MVC and visual studio

8. FUTURE WORK

- Functionality of Students which will allow each student to manage his/her profile
- Functionality of Alumni and his/her profile including Work details etc.

9. REFERENCES

- Introduction to ASP.NET MVC - Video Series, Microsoft Virtual Academy
- Entity Framework - Video Series, Microsoft Virtual Academy
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- C# 6.0 in a Nutshell by Ben Albahari and Joseph Albahari, O'rielly Publications
- Get started with Azure Cloud Services and ASP.NET, URL: https://docs.microsoft.com/en-us/azure/cloud-services/cloud-services-dotnet-get-started