UDTs To Add:

Structure of section:

• **Grandparent (/Domain)**

  ○ **Parent (/Subdomain)**

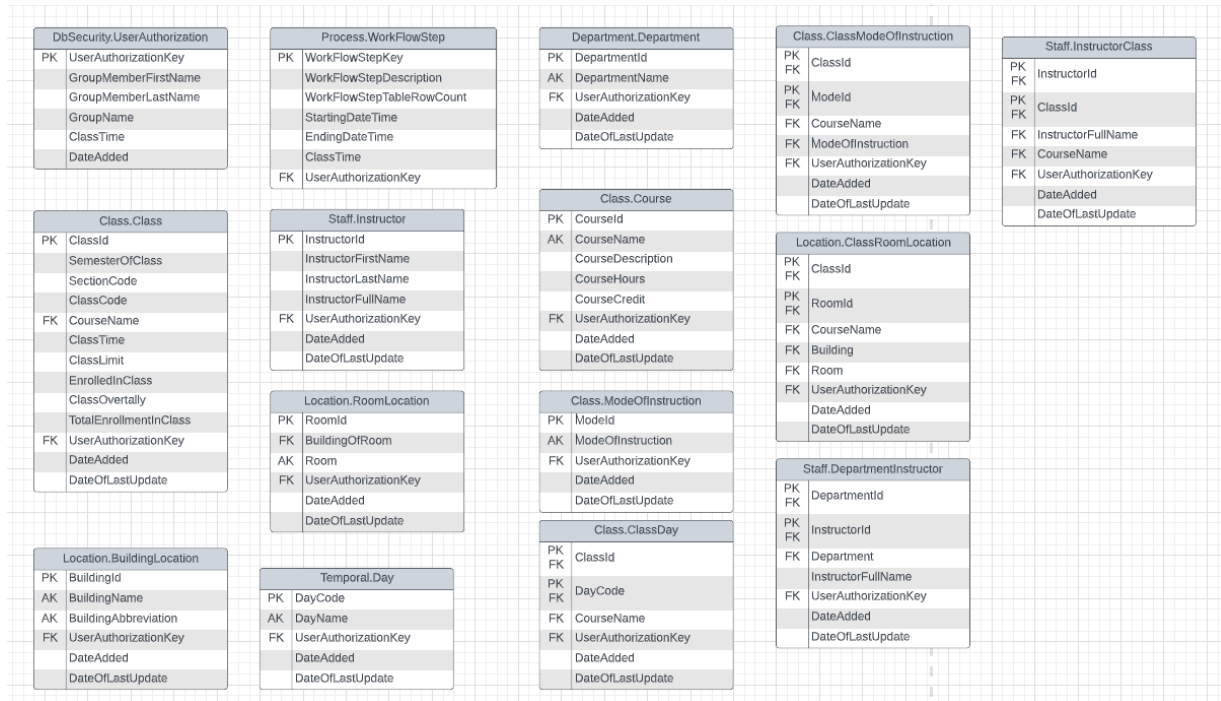   - **Child**

Etc.

UDTs:

• Numeric

 ○ KeyNumeric

  - SurrogateKeyInt (based on int) [Just a reusable type for surrogate keys]

 ○ ClassNumeric

  - ClassStatistic (based on smallint) [Reusable type for things related to tracking hours/credits, etc, of classes, smallint because these are all very small values, but big enough that tiny wont work]

 ○ RowCount (based on int) [For things related to tracking rows]

• String

 ○ WorkFlowDescription (based on nvarchar(500)) [Give sufficient space to describe workflow task]

 ○ AbbreviationString (based on nvarchar(4)) [General type to use for abbreviations, and all related fields are max 4 characters)

 ○ ClassTimeNchar5 (based on nchar(5)) [Type to be used when specifying our class time, which is is always 5 characters]

 ○ PersonName (Based on nvarchar(50)) [Longest Full name is 31 characters, so 50 characters give a lot more leeway]

 ○ ModeType (Based on nvarchar(12)) [Longest mode of instruction is 12 characters]

 ○ DayName (Based on nvarchar(16)) [TBD = 'To Be Determined' = 16 characters]

 ○ ClassString

  - CourseName (Based on nvarchar(14)) [Longest course name is 14 characters, gives a bit of leeway]
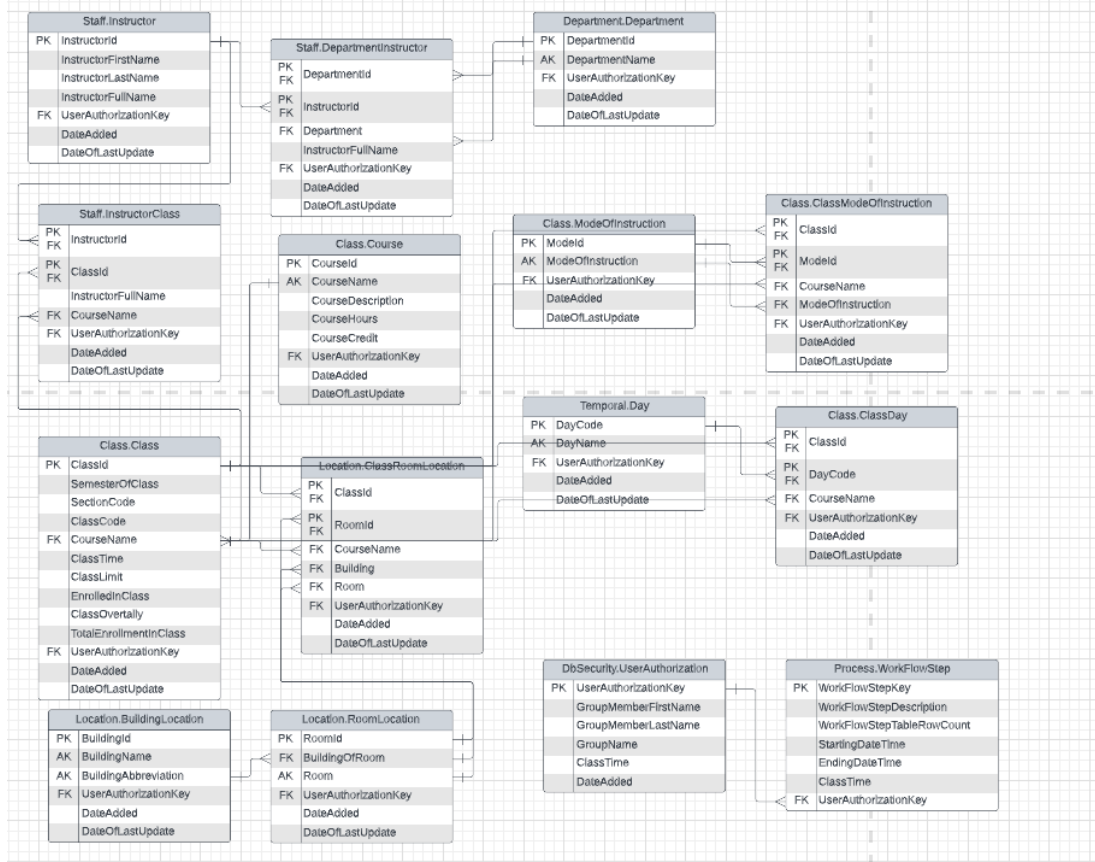
- DepartmentName (Based on nvarchar(6)) [Longest department name is 5 characters, give a bit of leeway]

    - CourseDescriptionString (Based on nvarchar(40)) [Give sufficient space for descriptions]

    - EncodingString (based on nvarchar(5)) [Longest class and secton codes get is 5 characters]

    - SemesterString (based on nchar(16)) [Only has 'Current Semester' as semester, which is fixed 16 characters]

    - ClassTimeInterval (based on nvarchar(20)) [Time intervals can get up to ~20 characters]

  ○ LocationString

    - RoomString (Based on nvarchar(9)) [Longest room name is 8 characters, this gives more leeway]

    - BuildingName (Based on nvarchar(25)) [Give sufficient space for building name]

• DateTime

  ○ DateYYYYMMDD-HH:MM:SS-7Prec (Based on DateTime2(7)) [Just a general reusable type for datetime2

ERD of Entire Database (Without relationships labeled)

Note: InstructorFullName in Staff.InstructorClass should not be a FK (was typo)

DbSecurity.UserAuthorization

PK	UserAuthorizationKey
	GroupMemberFirstName
	GroupMemberLastName
	GroupName
	ClassTime
	DateAdded

Process.WorkFlowStep

PK	WorkFlowStepKey
	WorkFlowStepDescription
	WorkFlowStepTableRowCount
	StartingDateTime
	EndingDateTime
	ClassTime
FK	UserAuthorizationKey

Department.Department

PK	DepartmentId
AK	DepartmentName
FK	UserAuthorizationKey
	DateAdded
	DateOfLastUpdate

Class.ClassModeOfInstruction

PK FK	ClassId
PK FK	ModeId
FK	CourseName
FK	ModeOfInstruction
FK	UserAuthorizationKey
	DateAdded
	DateOfLastUpdate

Staff.InstructorClass

PK FK	InstructorId
PK FK	ClassId
FK	InstructorFullName
FK	CourseName
FK	UserAuthorizationKey
	DateAdded
	DateOfLastUpdate

Class.Class

PK	ClassId
	SemesterOfClass
	SectionCode
	ClassCode
FK	CourseName
	ClassTime
	ClassLimit
	EnrolledInClass
	ClassOvertaly
	TotalEnrollmentInClass
FK	UserAuthorizationKey
	DateAdded
	DateOfLastUpdate

Staff.Instructor

PK	InstructorId
	InstructorFirstName
	InstructorLastName
	InstructorFullName
FK	UserAuthorizationKey
	DateAdded
	DateOfLastUpdate

Class.Course

PK	CourseId
AK	CourseName
	CourseDescription
	CourseHours
	CourseCredit
FK	UserAuthorizationKey
	DateAdded
	DateOfLastUpdate

Location.ClassRoomLocation

PK FK	ClassId
PK FK	RoomId
FK	CourseName
FK	Building
FK	Room
FK	UserAuthorizationKey
	DateAdded
	DateOfLastUpdate

Location.RoomLocation

PK	RoomId
FK	BuildingOfRoom
AK	Room
FK	UserAuthorizationKey
	DateAdded
	DateOfLastUpdate

Class.ModeOfInstruction

PK	ModeId
AK	ModeOfInstruction
FK	UserAuthorizationKey
	DateAdded
	DateOfLastUpdate

Staff.DepartmentInstructor

PK FK	DepartmentId
PK FK	InstructorId
FK	Department
	InstructorFullName
FK	UserAuthorizationKey
	DateAdded
	DateOfLastUpdate

Location.BuildingLocation

PK	BuildingId
AK	BuildingName
AK	BuildingAbbreviation
FK	UserAuthorizationKey
	DateAdded
	DateOfLastUpdate

Temporal.Day

PK	DayCode
AK	DayName
FK	UserAuthorizationKey
	DateAdded
	DateOfLastUpdate

Class.ClassDay

PK FK	ClassId
PK FK	DayCode
FK	CourseName
FK	UserAuthorizationKey
	DateAdded
	DateOfLastUpdate

ERD of Entire Database (With relationships shown)

Schema/Table Breakdown:

DbSecurity
• UserAuthorization

Process
• WorkFlowStep

Department
• Department

Temporal
• Day

Location
• BuildingLocation

• RoomLocation

• ClassRoomLocation

Class
• Course

• Class
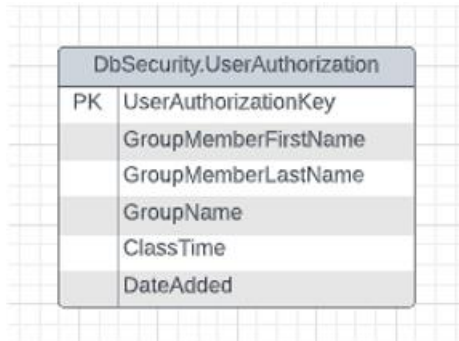
• ModeOfInstruction

• ClassDay

• ClassModeOfInstruction

Staff
• Instructor

• DepartmentInstructor

• InstructorClass

Tables To Add:

[DbSecurity].[UserAuthorization]:

ERD:

Column Data Types and Nullability:

• UserAuthorizationKey: SurrogateKeyInt, Identity(1,1), NOT NULL

• GroupMemberFirstName: PersonName, NOT NULL

• GroupMemberLastName: PersonName, NOT NULL

• ClassTime: ClassTimeNchar5, NOT NULL

• DateAdded: DateYYYYMMDD-HH:MM:SS-7Prec, NOT NULL

Constraints

• Primary Keys are marked PK in the diagram – all PKs are clustered indexes

Default

• ClassTime: '09:15'

• DateAdded: SYSDATETIME()

[Process].[WorkFlowStep]:

ERD:
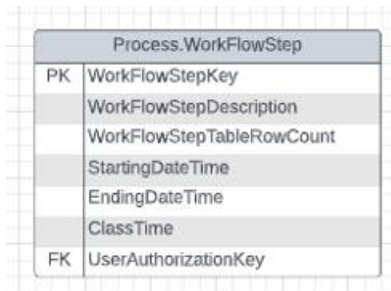
Column Data Types and Nullability:

• WorkFlowStepKey: SurrogateKeyInt, Identity(1,1), NOT NULL

• WorkFlowDescription: WorkFlowDescription, NOT NULL

• WorkFlowStepTableRowCount: RowCount, NOT NULL

• StartingDateTime: DateYYYYMMDD-HH:MM:SS-7Prec, NOT NULL

• EndingDateTime: DateYYYYMMDD-HH:MM:SS-7Prec, NOT NULL

• ClassTime: ClassTimeNchar5, NOT NULL

• UserAuthorizationKey: SurrogateKeyInt, NOT NULL

Constraints
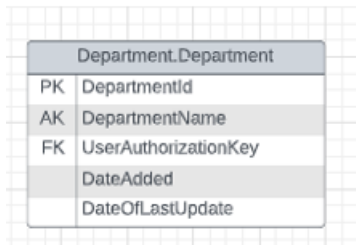
• Primary Keys are marked PK in the diagram – all PKs are clustered indexes, Foreign Keys are marked FK.

• Anything marked AK has a unique constraint

Default

• WorkFlowStepTableRowCount: 0

• ClassTime: '09:15'

[Department].[Department]:

ERD:

Column Changes:

Added Columns:

• DepartmentId: Just a surrogate key

• DepartmentName: To have a unique mapping to what department it is exactly

Column Data Types and Nullability:

• DepartmentId: SurrogateKeyInt, Identity(1,1), NOT NULL

• DepartmentName: DepartmentName, NOT NULL

• UserAuthorizationKey: SurrogateKeyInt, NOT NULL

• DateAdded: DateYYYYMMDD-HH:MM:SS-7Prec, NOT NULL

• DateOfLastUpdate: DateYYYYMMDD-HH:MM:SS-7Prec

Constraints

• Primary Keys are marked PK in the diagram – all PKs are clustered indexes, Foreign Keys are marked FK.

• Anything marked AK has a unique constraint
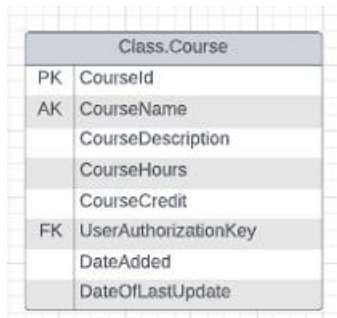
Check Constraint:

Default

• DateAdded, DateOfLastUpdate: SYSDATETIME()

[Class].[Course]:

ERD:

Column Changes:

Added Columns:
• CourseId: Just a surrogate key for the PK

• CourseHour: To separately track the hours of the course

• CourseCredit: To separately track the credits of the course

• CourseName: To separately track the name of the course

Removed Columns:
• Course (hr, crd): Just broke it up, getting the information you want from this is very effortful

Modified Columns:
• CourseDescription: renamed to be more explicit

Column Data Types and Nullability:
• CourseId: SurrogateKeyInt, Identity(1,1), NOT NULL

• CourseName: CourseName, NOT NULL

• CourseDescription: CourseDescriptionString, NOT NULL

• CourseHour: ClassStatistic, NOT NULL

• CourseCredit: ClassStatistic, NOT NULL

• UserAuthorizationKey: SurrogateKeyInt, NOT NULL

• DateAdded: DateYYYYMMDD-HH:MM:SS-7Prec, NOT NULL

• DateOfLastUpdate: DateYYYYMMDD-HH:MM:SS-7Prec

Constraints

• Primary Keys are marked PK in the diagram – all PKs are clustered indexes, Foreign Keys are marked FK.

• Anything marked AK has a unique constraint

Check Constraint:

CourseCredit >= 0 and CourseHour >= 0 (logically, neither should be negative)

CourseDescription LIKE [A-Z] [A-Z] [A-Z] [A-Z] [A-Z]% (at least an attempt to check it contains data, 5 enforced characters is a relatively decent amount to reduce odds of "garbage" entries)

Default

• DateAdded, DateOfLastUpdate: SYSDATETIME()

[Class].[Class]:

ERD:

Column Changes:

Added Columns:

• ClassOvertally: To separately track the students enrolled above the limit, thus allowing us to add a check constraint for enrollment amount

Modified Columns

• EnrolledInClass: Removed any overtallying amount from the Enrolled

• ClassLimit / EnrolledInClass/SemesterOfClass/SectionCode/ClassCode were all renamed into something more explicit

Column Data Types and Nullability:

• ClassId: SurrogateKeyInt, Identity(1,1), NOT NULL

• SemesterOfClass: SemesterString, NOT NULL

• SectionCode: EncodingString, NOT NULL

• ClassCode: EncodingString, NOT NULL

• CourseName: CourseName, NOT NULL

• ClassTime: ClassTimeInterval, NOT NULL

• ClassLimit: ClassStatistic, NOT NULL

• EnrolledInClass: ClassStatistic, NOT NULL

• ClassOvertally: ClassStatistic, NOT NULL

• TotalEnrollmentInClass: ClassStatistic (derived from enrolled + overtally, persisted), NOT NULL

• UserAuthorizationKey: SurrogateKeyInt, NOT NULL

• DateAdded: DateYYYYMMDD-HH:MM:SS-7Prec, NOT NULL

• DateOfLastUpdate: DateYYYYMMDD-HH:MM:SS-7Prec

Constraints
• Primary Keys are marked PK in the diagram – all PKs are clustered indexes, Foreign Keys are marked FK.

Check Constraint:
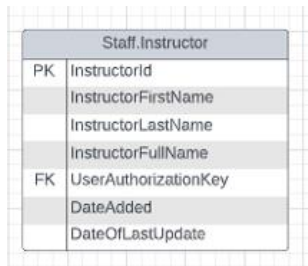Enrollment, Limit, and Overtally are all >= 0 (illogical for any of these to be negative)

Limit = 0 OR Limit <> 0 Enrollment <= Limit (illogical for enrollment to surpass limit, that's why we have overtally column. But also consider factor limit = 0 => limitless enrollment)

Default
• DateAdded, DateOfLastUpdate: SYSDATETIME()

• ClassTime: 'TBD' (no time decided yet)

[Staff].[Instructor]:

ERD:

Column Changes:

Added Columns:
• InstructorFirstName, LastName: To separately track the first and last names

• InstructorId: To have a surrogate key for PK purposes

Modified Columns
• InstructorFullName is now derived

Column Data Types and Nullability:
• InstructorId: SurrogateKeyInt, Identity(1,1), NOT NULL

• InstructorFirstName: PersonName, NOT NULL

• InstructorLastName: PersonName, NOT NULL

• InstructoreFullName: PersonName (derived from first + last name), NOT NULL

Note: if the initial full name is TBD, all name-related columns = 'TBD'

• UserAuthorizationKey: SurrogateKeyInt, NOT NULL

• DateAdded: DateYYYYMMDD-HH:MM:SS-7Prec, NOT NULL

• DateOfLastUpdate: DateYYYYMMDD-HH:MM:SS-7Prec

Constraints
• Primary Keys are marked PK in the diagram – all PKs are clustered indexes, Foreign Keys are marked FK.

Default
• DateAdded, DateOfLastUpdate: SYSDATETIME()

[Location].[BuildingLocation]:

ERD:
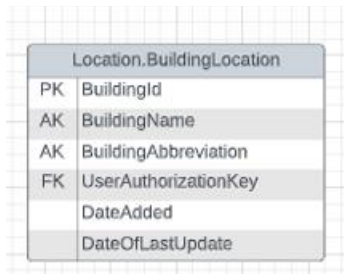
Column Changes:

Added Columns:

• BuildingId: Surrogate key to act as PK

• BuildingName: To have the specific full name of the table so you can parse the abbreviations

• BuildingAbbreviation: To have the short-hand version of the building name for bridging and searching purposes

Column Data Types and Nullability:

• BuildingId: SurrogateKeyInt, Identity(1,1), NOT NULL

• BuildingName: BuildingName, NOT NULL

• BuildingAbbreviation: AbbreviationString, NOT NULL

• UserAuthorizationKey: SurrogateKeyInt, NOT NULL

• DateAdded: DateYYYYMMDD-HH:MM:SS-7Prec, NOT NULL

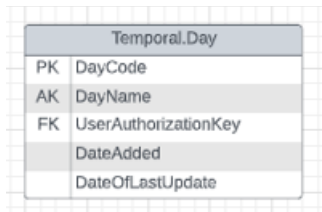• DateOfLastUpdate: DateYYYYMMDD-HH:MM:SS-7Prec

Constraints

• Primary Keys are marked PK in the diagram – all PKs are clustered indexes, Foreign Keys are marked FK.

• Anything marked AK has a unique constraint

Default

• DateAdded, DateOfLastUpdate: SYSDATETIME()

[Location].[RoomLocation]:

ERD:

	Location.RoomLocation
PK	RoomId
FK	BuildingOfRoom
AK	Room
FK	UserAuthorizationKey
	DateAdded
	DateOfLastUpdate

Column Changes:

Added Columns:

• RoomId: Surrogate key for PK purposes

• BuildingOfRoom: To have abbreviation of building stored for searching purposes

Column Data Types and Nullability:

• RoomId: SurrogateKeyInt, Identity(1,1), NOT NULL

• BuildingOfRoom: AbbreviationString, NOT NULL

• Room: RoomString, NOT NULL

• UserAuthorizationKey: SurrogateKeyInt, NOT NULL

• DateAdded: DateYYYYMMDD-HH:MM:SS-7Prec, NOT NULL

• DateOfLastUpdate: DateYYYYMMDD-HH:MM:SS-7Prec

Constraints

• Primary Keys are marked PK in the diagram – all PKs are clustered indexes, Foreign Keys are marked FK.

• Anything marked AK has a unique constraint

Default

• DateAdded, DateOfLastUpdate: SYSDATETIME()

[Temporal].[Day]:

ERD:

Column Changes:

Added Columns:
• DayName: To have a specific mapping of what the DayCodes are

Modified Columns
• DayCode renamed for more explicit naming

Column Data Types and Nullability:
• DayCode: AbbreviationString, NOT NULL

• DayName: DayName, NOT NULL

• UserAuthorizationKey: SurrogateKeyInt, NOT NULL

• DateAdded: DateYYYYMMDD-HH:MM:SS-7Prec, NOT NULL

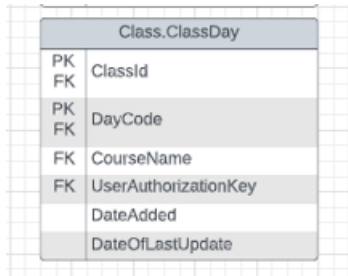• DateOfLastUpdate: DateYYYYMMDD-HH:MM:SS-7Prec

Constraints
• Primary Keys are marked PK in the diagram – all PKs are clustered indexes, Foreign Keys are marked FK. Anything marked AK has a unique constraint

Check Constraint:
• DayCode IN ('M', 'T', 'W', 'TH', 'F', 'S', 'SU', 'TBD') (basically disallows any more rows being inserted, as nothing else should ever be inserted in this table after initial day setup)

Default
• DateAdded, DateOfLastUpdate: SYSDATETIME()

• Set up a case statement that automatically matches up the abbreviations to the full name (this avoids any potential typos)

[Class].[ModeOfInstruction]:

ERD:

Class.ModeOfInstruction	
PK	ModeId
AK	ModeOfInstruction
FK	UserAuthorizationKey
	DateAdded
	DateOfLastUpdate

Column Changes:

Added Columns:
• ModeId: Surrogate key for PK purposes

Column Data Types and Nullability:

• ModeId: SurrogateKeyInt, Identity(1,1), NOT NULL

• ModeOfInstruction: ModeType, NOT NULL

• UserAuthorizationKey: SurrogateKeyInt, NOT NULL

• DateAdded: DateYYYYMMDD-HH:MM:SS-7Prec, NOT NULL

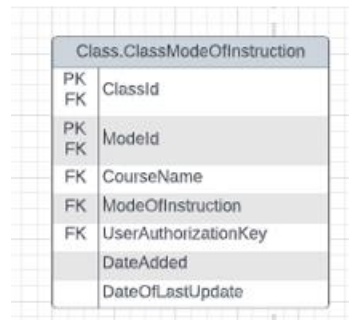• DateOfLastUpdate: DateYYYYMMDD-HH:MM:SS-7Prec

Constraints

• Primary Keys are marked PK in the diagram – all PKs are clustered indexes, Foreign Keys are marked FK.

• Anything marked AK has a unique constraint

Default
• DateAdded, DateOfLastUpdate: SYSDATETIME()

[Class].[ClassDay]:

ERD:

Column Data Types and Nullability:

• ClassId: SurrogateKeyInt, NOT NULL

• DayCode: AbbreviationString, NOT NULL

• CourseName: CourseName

• UserAuthorizationKey: SurrogateKeyInt, NOT NULL

• DateAdded: DateYYYYMMDD-HH:MM:SS-7Prec, NOT NULL

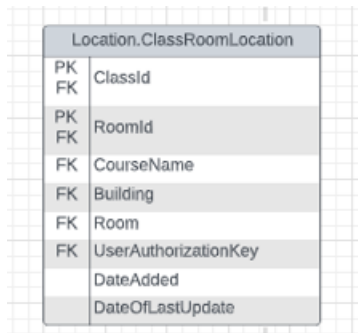• DateOfLastUpdate: DateYYYYMMDD-HH:MM:SS-7Prec

Constraints

• Primary Keys are marked PK in the diagram – all PKs are clustered indexes, Foreign Keys are marked FK.

Default

• DateAdded, DateOfLastUpdate: SYSDATETIME()

[Class].[ClassModeOfInstruction]:

ERD:

Column Data Types and Nullability:

• ClassId: SurrogateKeyInt, NOT NULL

• ModelId: SurrogateKeyInt, NOT NULL

• CourseName: CourseName, NOT NULL

• ModeOfInstruction: ModeType, NOT NULL

• UserAuthorizationKey: SurrogateKeyInt, NOT NULL

• DateAdded: DateYYYYMMDD-HH:MM:SS-7Prec, NOT NULL

• DateOfLastUpdate: DateYYYYMMDD-HH:MM:SS-7Prec

Constraints

• Primary Keys are marked PK in the diagram – all PKs are clustered indexes, Foreign Keys are marked FK.

Default

• DateAdded, DateOfLastUpdate: SYSDATETIME()

[Location].[ClassRoomLocation]:

ERD:

Column Data Types and Nullability:

• ClassId: SurrogateKeyInt, NOT NULL

• RoomId: SurrogateKeyInt, NOT NULL

• CourseName: CourseName, NOT NULL

• Building: AbbreviationString, NOT NULL

• Room: RoomString, NOT NULL

• UserAuthorizationKey: SurrogateKeyInt, NOT NULL

• DateAdded: DateYYYYMMDD-HH:MM:SS-7Prec, NOT NULL

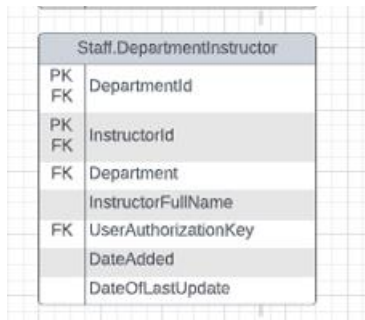• DateOfLastUpdate: DateYYYYMMDD-HH:MM:SS-7Prec

Constraints

• Primary Keys are marked PK in the diagram – all PKs are clustered indexes, Foreign Keys are marked FK.

Default

• DateAdded, DateOfLastUpdate: SYSDATETIME()

[Staff].[DepartmentInstructor]:

ERD:

Column Data Types and Nullability:

• DepartmentId: SurrogateKeyInt, NOT NULL

• InstructoreId: SurrogateKeyInt, NOT NULL

• Department: DepartmentName, NOT NULL

• InstructorFullName: PersonName, NOT NULL

• UserAuthorizationKey: SurrogateKeyInt, NOT NULL

• DateAdded: DateYYYYMMDD-HH:MM:SS-7Prec, NOT NULL

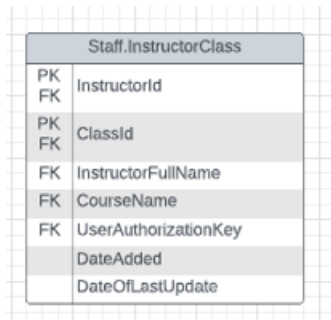• DateOfLastUpdate: DateYYYYMMDD-HH:MM:SS-7Prec

Constraints

• Primary Keys are marked PK in the diagram – all PKs are clustered indexes, Foreign Keys are marked FK.

Default

• DateAdded, DateOfLastUpdate: SYSDATETIME()

[Staff].[InstructorClass]:

ERD:

Column Data Types and Nullability:

• InstructorId: SurrogateKeyInt

• ClassId: SurrogateKeyInt

• InstructorFullName: PersonName

• CourseName: CourseName

• UserAuthorizationKey: SurrogateKeyInt, NOT NULL

• DateAdded: DateYYYYMMDD-HH:MM:SS-7Prec, NOT NULL

• DateOfLastUpdate: DateYYYYMMDD-HH:MM:SS-7Prec

Constraints

• Primary Keys are marked PK in the diagram – all PKs are clustered indexes, Foreign Keys are marked FK.

Default

• DateAdded, DateOfLastUpdate: SYSDATETIME()