Project Plan
Training Scheduling and Optimization System

The Capstone Experience
Team United Airlines
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Michigan State University
Spring 2019
Functional Specifications

• Redesign the client’s 20-year-old maintenance training course scheduling system
• Current system has scattered functionality and unintuitive interface
• Maintain previous functionality while adding improvements
• Implement optimizer that suggests the best schedule based on a variety of attributes
Design Specifications

- Scheduling of classes
  - View and manage courses
  - Assign multiple instructors to a single course
  - Automate location suggestion based on resource availability
- Instructor time tracking
  - Tracks time with exception codes through a calendar and table view
- Course request ability
  - Allows a scheduler to be notified whenever a guest requests a new course to be scheduled
- Rosters and attendance tracking
  - Keep track of attendance within each course
  - Export a class completion roster on the final day of the course
- Schedule Optimizer
  - Suggest an optimal schedule based on classroom resources and instructor availability
**Screen Mockup: Schedule**

![Screen Mockup: Schedule](image)

### Schedule of Classes

<table>
<thead>
<tr>
<th>Action</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Start Date</th>
<th>End Date</th>
<th>Start Time</th>
<th>Room</th>
<th>Location</th>
<th>Point</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>🗓️📅</td>
<td>A456789</td>
<td>B757 Systems Avionics (2 week)</td>
<td>1/20/19</td>
<td>1/27/19</td>
<td>07:00</td>
<td>001D87</td>
<td>DEN</td>
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Screen Mockup: Exceptions

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<tr>
<th>Action</th>
<th>Supervisor</th>
<th>Instructor</th>
<th>Exceptions</th>
<th>Start Date</th>
<th>End Date</th>
<th>Comment</th>
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<tbody>
<tr>
<td></td>
<td>Mr. Supervisor</td>
<td>John, Johnson</td>
<td>VAC: Vacation</td>
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Screen Mockup: Calendar
Screen Mockup: iOS Schedule

Schedule

Monday January 21, 2019

B757 Systems Avionics (001D87)
1/20/19 - 1/27/19
07:00
DEN
Musk, Elon

B757 Systems Avionics (001D87)
1/20/19 - 1/27/19
07:00
DEN
Musk, Elon

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Course Catalog

Filter

B757 Systems Avionics (2 week)
A137
Special Requirements *

B757 Systems Avionics (2 week)
A137
Special Requirements *

B757 Systems Avionics (2 week)
A137
Special Requirements *

B757 Systems Avionics (2 week)
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Screen Mockup: iOS Exceptions

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Hello Mr. Supervisor,
I'll be taking the week of January 20 off as discussed for vacation.

Comments:

- Deny
- Approve
Technical Specifications

• Web App:
  ▪ An ASP.NET Core back-end using Entity Framework will retrieve and process data from the database
  ▪ Present the data with Angular 7 and Bootstrap 4.2 on front-end

• iOS App:
  ▪ Using XCode storyboards to create UI
  ▪ Utilize Swift in combination with MVC

• REST API:
  ▪ Connection from both iOS and web app to the back-end

• Microsoft SQL Server:
  ▪ Allows for storage and retrieval of all data
System Architecture

- **Web App**
  - node
  - Angular
  - CSS
  - HTML5

- **iOS App**
  - Swift

- **Web Service**
  - REST API

- **Back-End**
  - ASP.NET Core
  - C#
  - SQL Server
System Components

• Hardware Platforms
  ▪ PC / Mac
  ▪ iOS devices (iPhone and iPad)
  ▪ Rack server for database

Software Platforms / Technologies
  ▪ Visual Studio 2017 Community Edition
  ▪ XCode 10
  ▪ DayPilot Calendar Plugin
  ▪ Angular 7, Node.js, Entity Framework, REST API, ASP.NET Core, C#, Swift, Microsoft SQL Server 2016
Risks

• Consistent user experience
  ▪ It is important to minimize the effort of the users to become familiar with the new system
  ▪ Frequent demonstrations of the prototypes to the client to ensure a smooth transition from the old platform to the new

• Excel spreadsheet conversion
  ▪ United Airlines currently uses a complex excel spreadsheet system to determine the locations of the courses. It is unknown if it is possible to decompose the excel sheets in an automatic process
  ▪ Develop prototype of the automated process and work with the current United Airlines scheduler to ensure desired functionality

• Web service connection
  ▪ iOS prevents connections to sites that are not secure (https) without an SSL certificate
  ▪ Contact university’s website services department to determine whether we can get approved in the MSU SSL certification program. If not, reach out to professors with subject matter knowledge for assistance

• Accuracy of the mock data
  ▪ The mock data we generated may result in improper feature developments because of possible inaccuracies in the data itself
  ▪ Confirm with the client that our mock data is a good representation of the current data in the existing system to guarantee features are developed as intended
Questions?