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Introduction and Module Summary
Objectives and Outcomes

Catalog Description
Prerequisite: IT 5433 and IT 5443

This core course covers technologies and methods of designing and implementing an IT application built from multiple subsystems. Students will explore modern system architectures and integration techniques used in enterprise environment. Students will develop a complete IT application through a major project to demonstrate their proficiency in all major technical areas of IT. These may include data management, networking and communication, servers and platforms, application development, user interface, web interface or security.

Course Outcomes
Students who complete this course successfully will be able to

- Plan, design, and develop as a team a complete IT application that consists of sub-system components.
- Implement and test the IT application integration.

Module 1 Innovations

Introduction and Module Summary

In this module, you will learn how software changed almost every field and what new technology innovations will soon change our world. After researching how to generate the best ideas, you will decide on which idea you will work this semester.
### Objectives and Outcomes

This module directly supports highlighted course outcome(s)
Students who complete this course successfully will be able to

1. Plan, design, and develop as a team a complete IT application that consists of subsystem components.
2. Implement and test the IT application integration.

| Module outcomes and activities: |  
|---|---|---|
| After completing this module, students will be able: | Appreciate how computing contributes to solving tomorrow's complex problems | Identify a problem and plan a solution through the application of computing |
| Read assigned materials | introduced | introduced |
| Watch assigned videos | introduced | introduced |
| Complete Module Lab | reinforced | reinforced |

### Required Materials

4. How to Turn Your Idea Into a Product (and Launch It!) https://www.businessnewsdaily.com/8773-turn-your-idea-into-a-product.html
7. 10 Ways Your Phone Will Save Your Life https://www.youtube.com/watch?v=unsxUaOq8LA (video: 9:45)

### Optional Materials


### Module 2 Rapid Application Development

#### Introduction and Module Summary

In this module, you will learn about Agile Software Development and advantages of Rapid Application Development (RAD). You will start prototype phase for your team project and find your customers.

#### Objectives and Outcomes

This module directly supports highlighted course outcome(s) Students who complete this course successfully will be able to

1. Plan, design, and develop as a team a complete IT application that consists of subsystem components.
Module outcomes and activities:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain how Rapid Application Development works</td>
<td>Build group project prototype</td>
</tr>
<tr>
<td>Read assigned materials</td>
<td>introduced</td>
</tr>
<tr>
<td>Watch assigned videos</td>
<td>reinforced</td>
</tr>
<tr>
<td>Complete Module Lab</td>
<td>mastered</td>
</tr>
</tbody>
</table>

Required Materials

1. What is Rapid Application Development and When Should You Use It?
   [https://blog.capterra.com/what-is-rapid-application-development/](https://blog.capterra.com/what-is-rapid-application-development/)
2. Understanding Rapid Application Development Model
   [https://theappsolutions.com/blog/development/rad-model/](https://theappsolutions.com/blog/development/rad-model/)
3. What is Rapid Application Development
   [https://www.youtube.com/watch?v=JHcxbGwHtsY](https://www.youtube.com/watch?v=JHcxbGwHtsY) (video 27:24) slides
   [https://www.slideshare.net/OutSystems/what-is-rapid-application-development](https://www.slideshare.net/OutSystems/what-is-rapid-application-development)
4. IBM, remote-work pioneer, is calling thousands of employees back to the office

Module 3 Team Dynamics

**Introduction and Module Summary**

In this module, you will learn the differences between groups and teams. You will use 10 Team Dynamics of High-Performance Teams to evaluate and improve your own team during each of five stages of group development: Forming, Storming, Norming, Performing, and Adjourning. Then you will apply your knowledge to adopt a model that best fits your team dynamics.

**Objectives and Outcomes**

This module directly supports highlighted course outcome(s)

Students who complete this course successfully will be able to

1. **Plan, design, and develop as a team a complete IT application that consists of sub-system components.**
2. Implement and test the IT application integration.

Module outcomes and activities:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain how team dynamics can influence project outcomes</td>
<td>Compare and contrast roles of product owner and team leader</td>
</tr>
<tr>
<td>Read assigned materials</td>
<td>introduced</td>
</tr>
<tr>
<td>Watch assigned videos</td>
<td>reinforced</td>
</tr>
<tr>
<td>Complete Module Discussion</td>
<td>mastered</td>
</tr>
</tbody>
</table>

Required Materials

1. Group Dynamics
2. 10 Team Dynamics that All Great Teams-Share
   [https://mikecardus.com/10-team-dynamics-that-all-great-teams-share/](https://mikecardus.com/10-team-dynamics-that-all-great-teams-share/) slides 1-15 or transcript on the page.
3. Team Effectiveness
   [http://libguides.gwumc.edu/c.php?g=365963&p=2473007](http://libguides.gwumc.edu/c.php?g=365963&p=2473007) (all four pages)
5. Feature Teams [https://less.works/less/structure/feature-teams.html](https://less.works/less/structure/feature-teams.html)
6. The Role of the Agile Product Owner [https://www.youtube.com/watch?v=-Tz_sMoVLbg](https://www.youtube.com/watch?v=-Tz_sMoVLbg) (video 3 min) or A Product Owner in the team? What for? [https://jp-lambert.me/a-product-owner-in-the-team-what-for-5f86607b04c1](https://jp-lambert.me/a-product-owner-in-the-team-what-for-5f86607b04c1)
7. [https://www.mountaingoatsoftware.com/agile/user-stories](https://www.mountaingoatsoftware.com/agile/user-stories)

Optional Materials


### Module 4 MEAN Stack (MN)

**Introduction and Module Summary**

In this module, you will start installation and testing of the development environment for this course. By the end of this module, you will have Node.js and MongoDB installed and configured.

**Objectives and Outcomes**

This module directly supports highlighted course outcome(s)

Students who complete this course successfully will be able to

1. **Plan, design, and develop as a team a complete IT application that consists of subsystem components.**
2. Implement and test the IT application integration.

**Module outcomes and activities:**

<table>
<thead>
<tr>
<th>After completing this module, students will be able:</th>
<th>Create development environment for individual and group projects</th>
<th>Test development environment for individual and group projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read assigned materials</td>
<td>introduced</td>
<td>introduced</td>
</tr>
<tr>
<td>Watch assigned videos</td>
<td>reinforced</td>
<td>reinforced</td>
</tr>
<tr>
<td>Complete Module Lab</td>
<td>reinforced</td>
<td>reinforced</td>
</tr>
</tbody>
</table>

**Required Materials**


2. MongoDB Tutorial [https://www.youtube.com/watch?v=pWbMrx5rVBE](https://www.youtube.com/watch?v=pWbMrx5rVBE) (video 32 min) and [https://docs.mongodb.com/manual/tutorial/getting-started/](https://docs.mongodb.com/manual/tutorial/getting-started/)

**Optional Materials**


### Module 5 MEAN Stack (EA)

**Introduction and Module Summary**

In this module, you will complete installation and testing of the development environment.
for this course. By the end of this module, you will have Express and Angular installed and configured.

**Objectives and Outcomes**

This module directly supports highlighted course outcome(s)

Students who complete this course successfully will be able to

1. **Plan, design, and develop as a team a complete IT application that consists of sub-system components.**
2. Implement and test the IT application integration.

**Module outcomes and activities:**

<table>
<thead>
<tr>
<th>After completing this module, students will be able:</th>
<th>Create development environment for individual and group projects</th>
<th>Test development environment for individual and group projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read assigned materials</td>
<td>reinforced</td>
<td>reinforced</td>
</tr>
<tr>
<td>Watch assigned videos</td>
<td>reinforced</td>
<td>reinforced</td>
</tr>
<tr>
<td>Complete Module Lab</td>
<td>mastered</td>
<td>mastered</td>
</tr>
</tbody>
</table>

**Required Materials**

1. Made with Angular [https://www.madewithangular.com/categories/angular](https://www.madewithangular.com/categories/angular)
5. AngularJS vs Angular 2 vs Angular 4 [https://www.youtube.com/watch?v=9Atq8COXxI](https://www.youtube.com/watch?v=9Atq8COXxI) (video 4 min)

**Optional Materials**


**Module 6 Angular Forms**

**Introduction and Module Summary**

In this module, you will learn why reactive programming gained popularity among developers and customers, start modeling your group project application and learn how to create reactive forms.

**Objectives and Outcomes**

This module directly supports highlighted course outcome(s)

Students who complete this course successfully will be able to

1. **Plan, design, and develop as a team a complete IT application that consists of sub-system components.**
2. Implement and test the IT application integration.
Module outcomes and activities:

<table>
<thead>
<tr>
<th>After completing this module, students will be able:</th>
<th>Appreciate reactive programming</th>
<th>Create reactive forms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read assigned materials</td>
<td>introduced</td>
<td>introduced</td>
</tr>
<tr>
<td>Watch assigned videos</td>
<td>reinforced</td>
<td>reinforced</td>
</tr>
<tr>
<td>Complete Module Lab</td>
<td>reinforced</td>
<td>reinforced</td>
</tr>
</tbody>
</table>

Required Materials

2. What is Reactive Programming? [https://blog.redelasc.com/what-is-reactive-programming-bc9fa7f47a7fc](https://blog.redelasc.com/what-is-reactive-programming-bc9fa7f47a7fc)
5. Reactive Forms - The Basics [https://www.youtube.com/watch?v=JeeUY6WaXiA](https://www.youtube.com/watch?v=JeeUY6WaXiA) video 15 min.

Optional Materials

1. The Reactive Manifesto [https://www.reactivemanifesto.org/](https://www.reactivemanifesto.org/)
2. Reactive Programming in Angular [https://blog.nrwl.io/reactive-programming-in-angular-7dcded697e6c](https://blog.nrwl.io/reactive-programming-in-angular-7dcded697e6c)

Module 7 TypeScript and JSON

Introduction and Module Summary

In this module, you will learn about JavaScript history and how JavaScript is related to TypeScript. You will write TypeScript code, compile and run it in a browser and in a console window. You will learn about JavaScript Object Notation.

Objectives and Outcomes

This module directly supports highlighted course outcome(s)

Students who complete this course successfully will be able to

1. Plan, design, and develop as a team a complete IT application that consists of sub-system components.
2. Implement and test the IT application integration.

Module outcomes and activities:

| After completing this module, students will be able: | Write, compile and run TypeScript code | Use JSON files | Create and test a disaster recovery plan for your project |
Module 8 Angular Components

Introduction and Module Summary

In this module, you will learn more about Angular components and how data binding works.

Objectives and Outcomes

This module directly supports highlighted course outcome(s)

Students who complete this course successfully will be able to

1. Plan, design, and develop as a team a complete IT application that consists of subsystem components.
2. Implement and test the IT application integration.

Module outcomes and activities:

<table>
<thead>
<tr>
<th>After completing this module, students will be able:</th>
<th>Create and use Angular components</th>
<th>Create a model for group project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read assigned materials</td>
<td>introduced</td>
<td>reinforced</td>
</tr>
<tr>
<td>Watch assigned videos</td>
<td>reinforced</td>
<td></td>
</tr>
<tr>
<td>Complete Module Lab</td>
<td>mastered</td>
<td>mastered</td>
</tr>
</tbody>
</table>

Required Materials

1. Introduction to Components https://angular.io/guide/architecture-components
3. Angular 6 Tutorial 9: Two-way data binding https://www.youtube.com/watch?v=6wUCBJ2Dew (video 11 min)
5. How to Design User-flow Diagrams https://www.youtube.com/watch?v=Ww-y59eVRAE

Optional Materials

1. V8 https://github.com/v8/v8/wiki
3. Make Types from JSON files https://jvilk.com/MakeTypes/
Module 9 Angular Directives

Introduction and Module Summary

In this module, you will learn how to manipulate DOM using Angular directives and how to change the appearance and behavior of an element.

Objectives and Outcomes

This module directly supports highlighted course outcome(s)

Students who complete this course successfully will be able to

1. Plan, design, and develop as a team a complete IT application that consists of sub-system components.
2. Implement and test the IT application integration.

Module outcomes and activities:

<table>
<thead>
<tr>
<th>After completing this module, students will be able:</th>
<th>Implement branching and looping in an Angular application</th>
<th>Change attributes of an element based on the user input</th>
<th>Improve group project outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read assigned materials</td>
<td>introduced</td>
<td>introduced</td>
<td>reinforced</td>
</tr>
<tr>
<td>Watch assigned videos</td>
<td>reinforced</td>
<td>strengthened</td>
<td></td>
</tr>
<tr>
<td>Complete Module Lab</td>
<td>mastered</td>
<td>mastered</td>
<td></td>
</tr>
</tbody>
</table>

Required Materials

3. Angular 6 Tutorial 29: Directives [https://www.youtube.com/watch?v=7j9XroLPwQ](https://www.youtube.com/watch?v=7j9XroLPwQ) (video 15 min)
5. Coping with Hitchhikers and Couch Potatoes on Teams [https://www2.isye.gatech.edu/~jvandeva/Classes/4106/CouchPotatoes.pdf](https://www2.isye.gatech.edu/~jvandeva/Classes/4106/CouchPotatoes.pdf)

Optional Materials

2. NgIf Directive [https://angular.io/api/common/NgIf](https://angular.io/api/common/NgIf)

Module 10 NodeJS and ExpressJS

Introduction and Module Summary

In this module, you will learn how to implement server-side logic and use Angular Material components in your project.

Objectives and Outcomes
This module directly supports highlighted course outcome(s)

Students who complete this course successfully will be able to

1. Plan, design, and develop as a team a complete IT application that consists of subsystem components.
2. Implement and test the IT application integration.

Module outcomes and activities:

<table>
<thead>
<tr>
<th>After completing this module, students will be able:</th>
<th>Develop an Angular application that can read data from a NodeJS/ExpressJS backend</th>
<th>Use Angular material form to send data to a NodeJS/ExpressJS backend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read assigned materials</td>
<td>Introduced</td>
<td>Introduced</td>
</tr>
<tr>
<td>Watch assigned videos</td>
<td>Reinforced</td>
<td></td>
</tr>
<tr>
<td>Complete Module Lab</td>
<td>Mastered</td>
<td>Reinforced</td>
</tr>
</tbody>
</table>

Required Materials

1. Express Middleware [https://coursework.vschool.io/express-middleware/](https://coursework.vschool.io/express-middleware/)
2. Express Routing [https://expressjs.com/en/guide/routing.html](https://expressjs.com/en/guide/routing.html) and [https://www.youtube.com/watch?v=tiMLxUKrB-g](https://www.youtube.com/watch?v=tiMLxUKrB-g) (video 8 min)
3. Node.js - RESTful API [https://www.tutorialspoint.com/nodejs/nodejs_restful_api.htm](https://www.tutorialspoint.com/nodejs/nodejs_restful_api.htm) and [https://www.youtube.com/watch?v=p-x6Wdwalco](https://www.youtube.com/watch?v=p-x6Wdwalco) (10 min)
5. Angular material Components [https://material.angular.io/components/categories](https://material.angular.io/components/categories)

Optional Materials


Module 11 MongoDB

Introduction and Module Summary

In this module, you will connect an Angular application to a MongoDB database and learn how to select, insert and delete data in a MongoDB database.

Objectives and Outcomes

This module directly supports highlighted course outcome(s)

Students who complete this course successfully will be able to

1. Plan, design, and develop as a team a complete IT application that consists of subsystem components.
2. Implement and test the IT application integration.

Module outcomes and activities:

| After completing this module, students will be able: | Connect an Angular application to MongoDB | select, insert and delete data in MongoDB from an Angular application |

http://ksuweb.kennesaw.edu/~speltsve/alg/IT6203_alg.html#_Toc531787393
Module 12 MongoDB (crUd)

Introduction and Module Summary

In this module, you will use routing to add a functional menu to the project and learn how to use an Angular application to update a record in a MongoDB database.

Objectives and Outcomes

This module directly supports highlighted course outcome(s)

Students who complete this course successfully will be able to

1. Plan, design, and develop as a team a complete IT application that consists of subsystem components.
2. Implement and test the IT application integration.

Module outcomes and activities:

<table>
<thead>
<tr>
<th>After completing this module, students will be able:</th>
<th>Use Angular routing</th>
<th>Use an Angular application to update documents in a MongoDB database</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read assigned materials</td>
<td>Introduced</td>
<td>Introduced</td>
</tr>
<tr>
<td>Watch assigned videos</td>
<td></td>
<td>Reinforced</td>
</tr>
<tr>
<td>Complete Module Lab</td>
<td>Reinforced, Mastered</td>
<td>Mastered</td>
</tr>
</tbody>
</table>
Module 13 Conclusion

Introduction and Module Summary

In this module, you will learn about single sign-on and how it can be implemented with the NodeJS. Then we will discuss other important things in MEAN stack applications.

Objectives and Outcomes

This module directly supports highlighted course outcome(s)

Students who complete this course successfully will be able to

1. Plan, design, and develop as a team a complete IT application that consists of sub-system components.
2. Implement and test the IT application integration.

Module outcomes and activities:

<table>
<thead>
<tr>
<th>After completing this module, students will be able:</th>
<th>Discuss single sign-on concepts</th>
<th>Discuss features of a MEAN stack application.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read assigned materials</td>
<td>Introduce, reinforced</td>
<td>Introduced</td>
</tr>
<tr>
<td>Complete Module Discussion</td>
<td>Reinforce</td>
<td></td>
</tr>
</tbody>
</table>

Required Materials


Optional Materials

1. Certified OpenID Connect Implementations [https://openid.net/developers/certified/](https://openid.net/developers/certified/)
2. Need a demo SAML Service Provider? We got you covered... [https://community.rsa.com/community/products/securid/blog/2016/05/19/need-a-demon-saml-service-provider-we-got-you-covered](https://community.rsa.com/community/products/securid/blog/2016/05/19/need-a-demon-saml-service-provider-we-got-you-covered)