UNIVERSITY OF SARGODHA

DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

COURSE OUTLINE SPRING 2020

Course Title: System Integration and Architecture

Course Code: SE-4344

Credit Hours: *3*

Prerequisites: CMP-3310 (Software Engineering*)*

Instructor: Nadia Khizar

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DESCRIPTION & OBJECTIVES

The course aims to teach student about system integration issues, including integration in a system of systems and federation of systems, role of architectures in systems integration, performance and effectiveness.

READINGS

1. Enterprise Architecture for Integration: Rapid Delivery Methods and Technologies by Clive Finkelstein, Artech House Print on Demand; 1st Edition (March 31, 2006). ISBN-10: 1580537138
2. Systems Integration (Systems Engineering) by Jeffrey Grady, CRC-Press; 1st Edition (September 30, 2015). ISBN-10: 0849378311

CONTENTS

1. Enterprise Architecture (EA) and Enterprise Engineering (EE): The Evolution of EA,Zachman Framework for EA, EE for Rapid Development, Using EA of Enterprise Integration. [TB: Ch. 1][page no 1-16]
2. Balanced Scorecard and Strategy Maps (BSSM): Introduction, Basic Concepts of Balanced Scorecard, Basic Concepts of Strategy Maps, Examples of BSSM, Steps to Develop BSSM. [TB: Ch. 2] [page no 23-37]
3. Using Strategy Analysis (SA) to Define the Future: SA in Business Planning, The Steps of SA, SA for Project Specifications, Preparation for SA, Questionnaire Templates for EA. [TB: Ch. 3] [page no 41-69]
4. Governance Analysis Using EA: Responsibilities Imposed by Sarbanes-Oxley, Governance Analysis Framework for Sarbanes-Oxley, Step-by-Step Approach for Governance Analysis. [TB: Ch. 4] [page no 73-87]
5. Enterprise Architecture Methods: Methods for Building EA, Evolution of Systems Development Methodologies, Government Methods for Building EA, Department of Defense Architecture Frameworks, The Open Group Architecture Framework, EA Project Experience, Strategies for EA Implementation, EE for EA. [TB: Ch. 5] [page no 93-138]
6. Using Business-Driven Data Mapping for Integrated Data: EA Incremental Build Context, Data Modeling Conventions, Data Entity Types, Data Attribute Types. [TB:Ch. 6] [page no 143-192]
7. Strategic Modeling for Rapid Delivery of EA: EA Incremental Build Context, Developing Strategic Models, Identifying Business Activities from a Data Map. Deriving Project Plans for Rapid EA Delivery, Case Study Entity Dependency Problems. [TB: Ch. 7] [page no 195-237]
8. Strategic Alignment, Activity and Workflow Modeling, and Business Rules: EA Incremental Build Context, Define Strategic Alignment Matrices, Activity Modeling Concepts, Activity-Based Costing, Workflow Modeling, Business Rules for Workflow Modeling. [TB: Ch. 8] [page no 243-271]
9. Using Business Normalization for Future Business Needs:EA Incremental Build Context, Introduction to Normalization, 1st, 2nd, 3rd, and 4th Business Normal Form, Identifying Current and Future Business Needs, Capturing Expert Business Knowledge. [TB: Ch. 9] [page no 275-326]
10. Menu Design, Screen Design, Performance Analysis, and Process Modeling: EA Incremental Build Context, Initial Menu Structure from a Data Model, Preliminary Screen Designs from a Data Model, Database Capacity Planning and Transaction Performance, Prototyping from a Data Model, Process Modeling. [TB: Ch. 10] [page no 329-361]
11. Enterprise Application Integration Concepts: Technologies for Enterprise Integration, B2B Cost-Effective Business Drivers, XML Messaging and Repository Standards, ebXML, EAI Vendors and Products. [TB: Ch. 11] [page no 367-393]
12. Enterprise Portal Technologies for Integration: The Evolution of Enterprise Portals, Enterprise Portal Product Categories, Enterprise Portal Product Descriptions. [TB: Ch.12] [page no 397-411]
13. Web Services for Real-Time Integration: Introduction to Web Services, Intranet and Internet Web Services for Integration, XML Standards for Web Services, Web Services Evolution, Challenges in Phase 3 Evolution, Web Services Products. [TB: Ch.13] [page no 415-432]
14. Service-Oriented Architecture for Integration: Importance of Service-Oriented Architecture, Introduction to Service-Oriented and Event-Driven Architectures, SOA Business Process Management Products. [TB: Ch. 14] [page no 435-454]
15. Managing and Delivering EA: Virtualization and On-Demand Computing, Costs of Integration, Role of Modeling Tools, Modeling Tool Products and Directions, Key EA Principles, Future Directions in EA. [TB: Ch. 15] [page no 461-480]

COURSE SCHEDULE

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| Week  | Topics and Readings  | Dates  |
| 1. | Introduction to course outline, Enterprise Architecture (EA) and Enterprise Engineering (EE): The Evolution of EA,Zachman Framework for EA, EE for Rapid Development, Using EA of Enterprise Integration. [TB: Ch. 1] [page no 1-16] |  |
| 2. | Balanced Scorecard and Strategy Maps (BSSM): Introduction, Basic Concepts of Balanced Scorecard, Basic Concepts of Strategy Maps, Examples of BSSM, Steps to Develop BSSM. [TB: Ch. 2] [page no 23-37] |  |
| 3. | Using Strategy Analysis (SA) to Define the Future: SA in Business Planning, The Steps of SA, SA for Project Specifications, Preparation for SA, Questionnaire Templates for EA. [TB: Ch. 3] [page no 41-69] |  |
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| 5. | Enterprise Architecture Methods: Methods for Building EA, Evolution of Systems Development Methodologies, Government Methods for Building EA, Department of Defense Architecture Frameworks, The Open Group Architecture Framework, EA Project Experience, Strategies for EA Implementation, EE for EA. [TB: Ch. 5] **[**page no 93-138] |  |
| 6. | Using Business-Driven Data Mapping for Integrated Data: EA Incremental Build Context, Data Modeling Conventions, Data Entity Types, Data Attribute Types. [TB:Ch. 6] **[**page no 93-138] |  |
| 7. | Strategic Modeling for Rapid Delivery of EA: EA Incremental Build Context, Developing Strategic Models, Identifying Business Activities from a Data Map. Deriving Project Plans for Rapid EA Delivery, Case Study Entity Dependency Problems.[TB: Ch. 7] **[**page no 195-237] |  |
| 8. | Mid Term  |  |
| 9. | Strategic Alignment, Activity and Workflow Modeling, and Business Rules: EA Incremental Build Context, Define Strategic Alignment Matrices, Activity Modeling Concepts, Activity-Based Costing, Workflow Modeling, Business Rules for Workflow Modeling. [TB: Ch. 8] [page no 243-271] |  |
| 10. | Using Business Normalization for Future Business Needs:EA Incremental Build Context, Introduction to Normalization, 1st, 2nd, 3rd, and 4th Business Normal Form, Identifying Current and Future Business Needs, Capturing Expert Business Knowledge. [TB: Ch. 9] [page no 275-320] |  |
| 11. | Menu Design, Screen Design, Performance Analysis, and Process Modeling: EA Incremental Build Context, Initial Menu Structure from a Data Model, Preliminary Screen Designs from a Data Model, Database Capacity Planning and Transaction Performance, Prototyping from a Data Model, Process Modeling. [TB: Ch. 10] **[**page no 329-361] |  |
| 12. | Enterprise Application Integration Concepts: Technologies for Enterprise Integration, B2B Cost-Effective Business Drivers, XML Messaging and Repository Standards, ebXML, EAI Vendors and Products. [TB: Ch. 11] **[**page no 367-393] |  |
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| 14. | Web Services for Real-Time Integration: Introduction to Web Services, Intranet and Internet Web Services for Integration, XML Standards for Web Services, Web Services Evolution, Challenges in Phase 3 Evolution, Web Services Products. [TB: Ch.13] [page no 415-432] |  |
| 15. | Service-Oriented Architecture for Integration: Importance of Service-Oriented Architecture, Introduction to Service-Oriented and Event-Driven Architectures, SOA Business Process Management Products. [TB: Ch. 14] [page no 435-454] |  |
| 16. | Managing and Delivering EA: Virtualization and On-Demand Computing, Costs of Integration, Role of Modeling Tools, Modeling Tool Products and Directions, Key EA Principles, Future Directions in EA. [TB: Ch. 15] [page no 461-480] |  |

ASSIGNMENTS

1. **First Assignment**

Install the selected ERP system and get the software to work • Describe the ERP system, its source, supported modules & sub-functionalities, target audience, cost, unique features, etc. This is not intended to be a reproduction of the feature list or product brochure. Instead, you should identify the most relevant, distinguishing or otherwise important features.

1. **Second assignment**

 Peer Review Process Description.

In a peer review, co-workers of a person who created a software work product examine that product to identify defects and correct shortcomings. A review: • verifies whether the work product correctly satisfies the specifications found in any predecessor work product, such as requirements or design documents • identifies any deviation from standards, including issues that may affect maintainability of the software • suggests improvement opportunities to the author • promotes the exchange of techniques and education of the participants. All interim and final development work products are candidates for review, including: • requirements specifications • user interface specifications and designs • architecture, high-level design, and detailed designs and models • source code • test plans, designs, cases, and procedures • software development plans, including project management plan, configuration management plan, and quality assurance plan This document defines an overall peer review process. It includes procedures for conducting inspections and two types of informal peer review, a walkthrough and a passaround, as well as guidance for selecting the appropriate approach for each review .

1. **Third assignment**

 Solution of given quiz

RESEARCH PROJECT

ASSESSMENT CRITERIA

Sessional: 20

Midterm: 30

Final exam: 50

RULES AND REGULATIONS

* **Class Attendance and Absenteeism**

Students are required to attend all classes and lab meetings. Regular attendance in their class/laboratory sessions will be very helpful to maintain a satisfactory progress throughout their course. Attendance will be strictly enforced and evaluated according to the Student Attendance Control Criteria announced by the DOCSIT and UoS. Any student who exceeds the maximum allowable absence limit during the course will not be allowed to sit in the exams. The maximum allowed limit for this course is 25% which include both excused and unexcused absences.

* **Policy on Late Lab. / Project Report and Written Work =============**

Assignments are due at the beginning of the class on the date indicated in the course schedule or on the assignment.  If the due date is extended, you will be informed of this through notice board. Assignments will not be accepted after the classroom discussion occurs. Such discussion would provide an unfair advantage to those who are preparing/submitting the assignment after the fact. At the instructor's option, late assignments may be evaluated to provide feedback, but WILL NOT BE GRADED. Late assignments will receive a grade of zero.

* **Academic Integrity**

Cheating in any form will not be tolerated and could lead to severe consequences. Academic work submitted by the students in the form of homework, assignment, or a project must be the result of their own effort.

* **Make-Up Exam Policy**

A student who has missed an exam will be allowed to sit in a make-up exam only if he or she provides a medical report from a government hospital/clinic.

* **General Behavior**

Students must maintain a good behavior both in and outside their classes. They are required to keep their mobile phones switched off while attending their class/laboratory sessions or writing their exams. Any student who engages in a behavior that disrupts the learning environment may face disciplinary action under the UoS code. Students must also maintain a smoke free environment in all college facilities.