



Template of Course Specification

Faculty: CIT
Department: SE
Program: B.SE

I. General information about the course:						
1.	Course Title:	Software Design & Architecture				
2.	Course Code and Number :	SE311				
3.	Credit Hours: 3	Lecture	Seminar/Tutorial	Practical	Training	Total
		2	2	--	--	3
4.	Study Level and Semester:	Level 3 / Semester 6				
5.	Pre-requisites (if any):	Software Engineering (CS325)				
6.	Co-requisites (if any) :	---				
7.	Program in which the course is offered	B.SC(Software Engineering)				
8.	Teaching Language:	English				
9.	Study System :	Semester Based				
0.	Prepared by :	Course Facilitator (wadee alqubati)				
1.	Approval date :					
2.	Approved by:	Department				

II. Course Description:
<p>This Course is designed to cover This course covers the fundamental design principles and strategies for software architecture and design: Architecture requirements specification , Architectural styles, Object-Oriented Paradigm , Data-Centered Software Architecture, Hierarchical Architecture , Architecture documentation, reference architecture, and interface design in detail design process are discussed. Students participate in a group project on software design and architecture and design tools.</p>
III. Course Aims
<p>This Course aims to:</p> <ol style="list-style-type: none"> 1. Characterize a generic process of reference architecture. 2. Understand the difference in Architectural styles for different situations. 3. apply Effectively and efficiently for Architecture requirements specification, Architecture design, Architecture documentation, and Architecture validation 4. Conduct Architectural modeling through analytical methods. 5. Choose among Architecture techniques and use an appropriate technique based on the context.

VI. Course Intended Learning Outcomes (CILOs) :	
Knowledge and Understanding:	
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Knowledge and Understanding PILOs	Knowledge and Understanding CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
A4. Understand the software process life cycles, for small, medium and large software projects, and different approaches of software development, software project management, risk and quality management, and human-computer interaction.	a1. Recognize the principal of Software Architecture process activities in Architecture requirements specification, Architecture design, Architecture documentation, and Architecture validation
A5. Recognize the social, professional, legal, ethical, and cultural issues involved in the use of computer technology.	a2. Define the key issues of decisions that have to be made about the system architecture and architectural patterns during the architectural design process and key issues that have to be considered when implementing software.

Intellectual Skills :	
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Intellectual Skills PILOs	Intellectual Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
B1. Determine and analyze criteria, specifications and requirements appropriate to specific computing problems and formulate strategies to solve them.	b1. Systematize the principal software engineering of software architecture activities .
B2. Differentiate the various methods of computational thinking, determining their wide relevance and applicability within other domains in everyday life, and being able to employ them in different conditions.	b2. Differentiate between Data Flow Architectures, Data-Centered Software Architecture, and Hierarchical Architecture, and propose the appropriate Architectural styles and techniques for the development of each type of software system.
B3. Choose the most appropriate methods and tools including deploying appropriate theory, practices, and tools for the specification, design, implementation, and maintenance as well as the evaluation of computer-based systems.	b3. Evaluate and choose between UML and ADL for Software Architecture b4. Design and implement software architecture in a Data-aspect Architectures and to estimate the cost for the development.
B4. Criticize systems in terms of general quality attributes and possible tradeoffs presented within the given problem.	b5. Evaluate and choose between Architecture Styles, and define the necessary quality attributes that have to be considered when design and implementing solution for the given problem.

Professional and Practical Skills	
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Professional and Practical Skills PILOs	Professional and Practical Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
C1. Apply fundamental concepts of computer science, software engineering, human-computer interaction, science and mathematics in the modeling and design of computer systems.	c1. apply the techniques in software architectural units.
C2. Develop a wide range of software through all stages of their life cycle, namely problem analysis, requirements specification, design, construction; verification and evolution using appropriate methods and tools.	c2. Use Approach to Design software Architecture.
C3. Operate computing equipment and software systems effectively and efficiently.	c3. apply the diagram types in the Unified Modeling Language (UML) .
C4. Evaluate software process and artifacts in terms of software quality and models.	c4. Use CASE tools and graphical models to represent

Transferable (General) Skills :	
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Transferable (General) Skills PILOs	Transferable (General) Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
D1. Communication skills: Make succinct presentations to a range of audiences about technical problems and their solutions. This may involve face-to-face, written communication or electronic communication.	d1. communicate effectively well-informed and well-reasoned positions on these issues, verbally (oral analysis) and in writing (project report) by applying critical thinking reasoning skills.
D2. Teamwork: Be able to work effectively as a member of a development team.	d2. work in a team of software engineering project taking into account the ethical issues related to software development tasks
D4. Self-management skills: Manage one's own learning and development, including time management and organizational skills.	d3. Write project - technical report and present projects/assignments
D5. Professional development skills: Keep abreast of current developments in the discipline to continue one's own professional development.	d4. use the techniques, skills, and modern engineering tools necessary for engineering practice

VI. Alignment of CILOs to Teaching and Assessment Strategies

First: Alignment of Knowledge and Understanding CILOs

Knowledge and Understanding CILOs	Teaching Strategies	Assessment Strategies
a1. Recognize the principal of Software Architecture process activities in Architecture requirements specification, Architecture design, Architecture documentation, and Architecture validation	Lectures	Written Exam
	Group Discussions	Observation
	Lab sessions	Report/Screen shots
	Brain Storming	Viva/Direct Questions
a2. Define the key issues of decisions that have to be made about the system architecture and architectural patterns during the architectural design process and key issues that have to be considered when implementing software.		Quiz

Second: Alignment of Intellectual Skills CILOs

Intellectual Skills CILOs	Teaching Strategies	Assessment Strategies
b1. Systematize the principal software engineering of software architecture activities .	Lectures	Written test Quizzes
b2. Differentiate between Data Flow Architectures, Data-Centered Software Architecture, and Hierarchical Architecture, and propose the appropriate Architectural styles and techniques for the development of each type of software system.	Lab sessions	Lab technical report
	Case study	Report
	Assignment	
b3. Evaluate and choose between UML and ADL for Software Architecture		
b4. Design and implement software architecture in a Data-aspect Architectures and to estimate the cost for the development.		
b5. Evaluate and choose between Architecture Styles, and define the necessary quality attributes that have to be considered when design and implementing solution for the given problem.		

Third: Alignment of Professional and Practical Skills CILOs		
Professional and Practical Skills CILOs	Teaching Strategies	Assessment Strategies
c1. apply the techniques in software architectural units.	Lab sessions	Technical Report Worksheets
c2. Use Approach to Design software Architecture.	Homework	Report + Presentation
c3. apply the diagram types in the Unified Modeling Language (UML) .		
c4. Use CASE tools and graphical models to represent.	Group Discussions	Observations

Fourth: Alignment of Transferable (General) Skills CILOs		
Transferable (General) Skills CILOs	Teaching Strategies	Assessment Strategies
d1. communicate effectively well-informed and well-reasoned positions on these issues, verbally (oral analysis) and in writing (project report) by applying critical thinking reasoning skills.	Grouping Tips Notes Case Study	Presentation Observation Report
d2. work in a team of software engineering project taking into account the ethical issues related to software development tasks		
d3. Write project - technical report and present projects/assignments		
d4. use the techniques, skills, and modern engineering tools necessary for engineering practice		

VII. Course topics and sub-topics (theoretical and practical) with contact hours and alignment to CILOs					
Topics/Units of Course Contents					
First: Theoretical Aspects					
No.	Course Topics/Units	Sub-topics	No. of Weeks	Contact Hours	CILOs
1	Introduction to Software Architecture	1- Software Architecture: Bridging Requirements and Implementation 2- Architecture Styles 3- Quality Attributes 4- Software Architecture Design Guidelines	1	2	a1, a2
2	Software Architecture Design Space	1- Types of Software Structures 2- Software Elements 3- Software Connectors 4- An Agile Approach to Software Architecture Design	2	4	a2,a4
3	Models for Software Architecture	1- UML for Software Architecture 2- Architecture View Models 3- Architecture Description Language (ADL)	1	2	All CILOs
4	Object-Oriented Paradigm	1- Introducing the Object-Oriented Paradigm 2- OO Analysis 3- OO Design 5- Design Principles	1	2	All CILOs
MID TERM EXAM					
6	Data Flow Architectures	1- Batch Sequential 2- Pipe and Filter Architecture 3- Process Control Architecture	2	4	All CILOs
7	Data-Centered Software Architecture	1- Repository Architecture Style 2- Blackboard Architecture Style	1	2	All CILOs
8	Hierarchical Architecture	1- Main-Subroutine 2- Master-Slave 3- Layered 4- Virtual Machine	2	4	All CILOs
9	Architecture of User Interfaces	1- Evolution of User Interfaces 2- Look and Feel (Syntax) of User Interfaces 3- Usability (Semantics) of User Interfaces 4- Design Considerations of User Interfaces 5- Enabling Technology 6- Direct Manipulation 7- Evaluation of User Interfaces	2	4	All CILOs
FINAL EXAM					
Total number of weeks and hours			12	24	

Second: Practical/Tutorial/Clinical Aspects				
Write up practical/tutorial/clinical topics				
No.	Practical/Tutorial/Clinical topics	No. of Weeks	Contact Hours	CILOs
1	Project List	1	2	c2, c3
2	Tutorial - Context	2	4	b1, c3
3	Tutorial - Conceptual Architecture	1	2	b2, c3
4	Project Deliverable I	1	2	b2, c3
5	Tutorial - Architecture Styles	1	2	b3, c3
6	Tutorial - Software Connector	1	2	c2, c3
7	Project Deliverable II	1	2	b1, c3
8	Tutorial - Architecture Analysis	1	2	c1, c2, c3
9	Project Deliverable II - template	1	2	c2, c3
10	Project Deliverable III	2	4	c2, c3 ,all D CILOs
Total number of weeks and hours		12	24	

I. Teaching Strategies
Lectures
Group Discussions
Case study
Assignment
Homework

الموصف المراجع مسؤول البرنامج رئيس القسم عميد الكلية
 أ.وديع القباطي أ.نبيل المخلافي د. عبدالقادر العبادي

II. Tasks and Assignments :

No.	Task/Assignment	CILOs	Week due	Mark
1	Assignment 1		10	5 %
2	Assignment 2		12	10 %

III. Learning Assessment:

No.	Assessment Tasks	Week due	Mark	Proportion of Final Assessment	Aligned CILOs
1	Assignments+ Project + Reports	12	25	25%	c1, c2, c3, d1
2	Quiz 1 & Quiz 2	4 & 9	5	5%	a1, a2
3	Mid term exam	7	20	20%	b1, b2, b3
4	Final Exam	15	50	50%	All course ILO's
Total			100	100%	

IV. Learning Resources :

(Author, (Year), Book Title, Edition, Publisher, Country of publishing)

Textbooks-not more than 2

1. K. Qian et al ; Xiang Fu; Lixin Tao; Chong-wei Xu ,(2009), Software Architecture and Design Illuminated, J. & B. Publishers .

Essential References-not less than 4

1. R. Taylor et al , (2010), Software Architecture: Foundations, Theory, and Practice, Wiley publications, USA.
2. D. Duggan , (2012),Enterprise Software Architecture and Design: Entities, Services, and Resource, Oxford : Wiley-Blackwell publications, USA.
3. Partha Kuchana, & Kuchana Kuchana, (2004),Software Architecture Design Patterns in Java , 2nd Edition, Taylor & Francis, USA.
4. Hassan Gomaa, (2011),Software Modeling and Design UML, Use Cases, Patterns, and Software Architectures , 4th Edition, Thomson Course Technology.

Electronic Materials and Web Sites

<http://my.safaribooksonline.com/book/software-engineering-and-development/9780763754204>

V. Course Policies (To be determined by Faculty Deanship):

Based on university regulations, the following aspects should be figured out:

1.	(Class Attendance) :
2.	(Tardy) :
3.	(Exam Attendance/Punctuality) :
4.	(Assignments & Projects) :
5.	(Cheating) :
6.	(Plagiarism) :
7.	(Other policies) :

Template of Course Syllabus

Faculty : **TIC**

Department: **SE**

Program : **B.SE**

I. General information about the course instructor :							
Name	(Facilitator)	Office Hours (3 Hours Weekly)					
Location & phone number	USTY	Sat	Sun	Mon	Tue	Wed	Thu
Email							

II. General information about the course:						
1.	Course Title :	Software Design & Architecture				
2.	Course Code and Number :	SE311				
3.	Credit Hours :	Credit Hours				Total
		Theoretical	Seminar/Tutorial	Practical	Training	
		2	2	--	--	3
4.	Study Level and Semester:	Level 3 / Semester 6 or 7				
5.	Pre-requisites (if any):	Software Engineering (CS325)				
6.	Co-requisites (if any):	---				
7.	Program in which the course is offered:	B.SC(Software Engineering)				
8.	Teaching Language:	English				
9.	Instruction location:	N/A				

عميد الكلية
د. عبدالقادر العبادي

رئيس القسم
أ. نبيل المخلافي

مسؤول البرنامج
أ. وديع القباطي

المراجع

الموصف

I. Course Description

This Course is designed to cover This course covers the fundamental design principles and strategies for software architecture and design: Architecture requirements specification , Architectural styles, Object-Oriented Paradigm , Data-Centered Software Architecture, Hierarchical Architecture , Architecture documentation, reference architecture, and interface design in detail design process are discussed. Students participate in a group project on software design and architecture and design tools.

II. Course Aims:

This course aims to:

1. Characterize a generic process of reference architecture.
2. Understand the difference in Architectural styles for different situations.
3. apply Effectively and efficiently for Architecture requirements specification, Architecture design, Architecture documentation, and Architecture validation
4. Conduct Architectural modeling through analytical methods.
5. Choose among Architecture techniques and use an appropriate technique based on the context.

III. Course Intended Learning Outcomes (CILOs) :

1. a1. Recognize the principal of Software Architecture process activities in Architecture requirements specification, Architecture design, Architecture documentation, and Architecture validation
2. a2. Define the key issues of decisions that have to be made about the system architecture and architectural patterns during the architectural design process and key issues that have to be considered when implementing software.
3. b1. Systematize the principal software engineering of software architecture activities .
4. b2. Differentiate between Data Flow Architectures, Data-Centered Software Architecture, and Hierarchical Architecture, and propose the appropriate Architectural styles and techniques for the development of each type of software system.
5. b3. Evaluate and choose between UML and ADL for Software Architecture
6. b4. Design and implement software architecture in a Data-aspect Architectures and to estimate the cost for the development.
7. b5. Evaluate and choose between Architecture Styles, and define the necessary quality attributes that have to be considered when design and implementing solution for the given problem.
8. c1. apply the techniques in software architectural units.
9. c2. Use Approach to Design software Architecture.
10. c3. apply the diagram types in the Unified Modeling Language (UML).
11. c4. Use CASE tools and graphical models to represent
12. d1. communicate effectively well-informed and well-reasoned positions on these issues, verbally (oral analysis) and in writing (project report) by applying critical thinking reasoning skills.
13. d2. work in a team of software engineering project taking into account the ethical issues related to software development tasks
14. d3. Write project - technical report and present projects/assignments
15. d4. use the techniques, skills, and modern engineering tools necessary for engineering practice

عميد الكلية

رئيس القسم

مسؤول البرنامج

المراجع

الموصف

د. عبدالقادر العبادي

أ. نبيل المخلافي

أ. وديع القباطي

IV. Course Contents

Theoretical Aspect:

No.	Course Units	Sub-topics	Week due	Contact Hours
1.	Unit-1	1. Introduction to Software Architecture 2. Software Architecture Design Space 3. Models for Software Architecture 4. Object-Oriented Paradigm	Week 5	10
2.	Unit-2	5. Data Flow Architectures 6. Data-Centered Software Architecture	Week 8	6
3.	Unit-3	7. Hierarchical Architecture	Week 10	4
4.	Unit-4	8. Architecture of User Interfaces	Week 12	4
Total number of weeks and hours			12	24

Second: Practical/Tutorial/Clinical Aspects :			
Write up practical/tutorial/clinical topics			
No.	Practical/Tutorial/Clinical topics	No. of Weeks	Contact Hours
1.	Project List	1	2
2.	Tutorial - Context	2	4
3.	Tutorial - Conceptual Architecture	1	2
4.	Project Deliverable I	1	2
5.	Tutorial - Architecture Styles	1	2
6.	Tutorial - Software Connector	1	2
7.	Project Deliverable II	1	2
8.	Tutorial - Architecture Analysis	1	2
9.	Project Deliverable II - template	1	2
10.	Project Deliverable III	2	4
Total number of weeks and hours		12	24

V. Teaching Strategies

1. Lectures
2. Group Discussions
3. Case study
4. Assignment
5. Homework
6. Brain Storming

VI. Tasks and Assignments

No.	Task/Assignment	Week due	Mark
1.	Assignment 1 + report	WEEK 12	10
2.	Assignment 2 + report	WEEK 14	15

الموصف المراجع مسؤول البرنامج رئيس القسم عميد الكلية
 أ.وديع القباطي أ.نبيل المخلافي د. عبدالقادر العبادي

VII. Learning Assessment:				
No.	Assessment Tasks	Assessment day & date	Mark	Weight
1	Quiz 1	WEEK 3	5	5%
2	Quiz 2	WEEK 5		
3	Mid term exam	WEEK 7	20	20%
4	Assignment	WEEK 9	10	10%
6	Project Deliverable	WEEK 12	15	15%
7	Reports	WEEK 12		
8	Final Exam	WEEK 13	50	50%
Total				

VIII. Learning Resources
<p>SKOOB TXET</p> <ol style="list-style-type: none"> 1. K. Qian et al ; Xiang Fu; Lixin Tao; Chong-wei Xu ,(2009), Software Architecture and Design Illuminated, J. & B. Publishers
<p>SECNEREFER</p> <ol style="list-style-type: none"> 1. R. Taylor et al , (2010), Software Architecture: Foundations, Theory, and Practice, Wiley publications, USA. 2. D. Duggan , (2012),Enterprise Software Architecture and Design: Entities, Services, and Resource, Oxford : Wiley-Blackwell publications, USA. 3. Partha Kuchana, & Kuchana Kuchana, (2004),Software Architecture Design Patterns in Java , 2nd Edition, Taylor & Francis, USA. 4. Hassan Gomaa, (2011),Software Modeling and Design UML, Use Cases, Patterns, and Software Architectures , 4th Edition, Thomson Course Technology.
<p>Electronic Materials and Web Sites:</p> <p>www.my.safaribooksonline.com/book/software-engineering-and-development/9780763754204.com</p>

IX. Course Policies (To be determined by Faculty Deanship)	
1.	Class Attendance :
2.	Tardy :
3.	Exam Attendance/Punctuality:
4.	Assignments & Projects:
5.	Cheating:
6.	Plagiarism:
7.	Other policies: