COURSE BASICS

Course Title**:** **Software Design & Architecture**
Course Code**:** **SEN-457**
Credit Hours**:** **2+1**
Prerequisite**:** **None**
Class & Section: **BSE 4 A&B**

COURSE OBJECTIVES AND DESCRIPTION:

This course will expose students to the concepts, principles, and state-of-the-art methods and use of UML in object-oriented analysis, software design, software pattern and software architecture, including domain-specific software architectures, architectural styles, their properties and the types of problems for which they are most appropriate, and architecture-based testing and analysis. The course also examines the practical applicability of architecture research, specifically its relationship to work in architectural frameworks and component interoperability platforms such as .NET. Particular emphasis will be given on adopting object oriented analysis and design in software engineering.

COURSE LEARNING OUTCOMES (CLO):

On successful completion of the course students will be able to:

CLO #	CLO Statement	Bloom's Taxonomy	Associated PLO
CLO1	Define fundamental concepts related to software design are architecture.	C1	PLO1
CLO2	Describe various architectural and design styles and patterns suitable for a given scenario.	C2	PLO1
CLO3	Apply design models using modeling and object-oriented programming languages.	C3	PLO3
CLO4	Analyze the suitability of various architectural styles and design patterns in relation to a given situation.	C4	PLO2
CLO5	Design object oriented design models to reflect implementation details.	C5	PLO3

WEEKLY BREAKDOWN:

Week	Week Days	Tentative Course Plan
1	Mar 7th – Mar 11th	INTRODUCTION TO THE COURSE; DEFINING SOFTWARE ARCHITECTURE & DESIGN CONCEPTS
2	Mar 14th – Mar 18th	DESIGN PRINCIPLES; OBJECT-ORIENTED DESIGN WITH UML

3	Mar 21st – Mar 25th	SYSTEM DESIGN & SOFTWARE ARCHITECTURE; OBJECT DESIGN, MAPPING DESIGN TO CODE
4	Mar 28th – Apr 1st	FUNCTIONAL DESIGN; UI DESIGN; WEB APPLICATIONS DESIGN **ASSIGNMENT & QUIZ #1**
5	Apr 4th – Apr 8th	MOBILE APPLICATION DESIGN; PERSISTENCE LAYER DESIGN
6	Apr 11th – Apr 15th	CREATIONAL DESIGN PATTERNS
7	Apr 18th – Apr 22nd	STRUCTURAL DESIGN PATTERNS **ASSIGNMENT & QUIZ #2**
8	Apr 25th – Apr 29th	BEHAVIORAL DESIGN PATTERNS
9		**MID TERM EXAMS**
10	May 9th – May 13th	INTERACTIVE SYSTEMS WITH MVC ARCHITECTURE; SOFTWARE REUSE
11	May 16th – May 20th	ARCHITECTURAL DESIGN ISSUES; ARCHITECTURE DESCRIPTION LANGUAGES (ADLS)
12	May 23rd – May 27th	ARCHITECTURAL STYLES/PATTERNS & DESIGN QUALITIES
13	May 30th – Jun 3rd	ARCHITECTURAL STYLES/PATTERNS & DESIGN QUALITIES **ASSIGNMENT & QUIZ #3**
14	Jun 6th – Jun 10th	QUALITY TACTICS; ARCHITECTURE DOCUMENTATION
15	Jun 13th – Jun 17th	ARCHITECTURAL EVALUATION TECHNIQUES
16	Jun 20th – Jun 24th	MODEL DRIVEN DEVELOPMENT **ASSIGNMENT (PRESENTATIONS) & QUIZ #4**
17	Jun 27th – Jul 1st	REVISION WEEK
18		**FINAL TERM EXAM**

NOTE:

a. *This schedule is subject to revisions as conditions may warrant.*

b. *Topics will be covered in sequence no matter if city observes any planned or unplanned holidays.*

c. *The information in this course outline is subject to revision as conditions may warrant.*

COURSE ASSESMENT METHOD

METHOD OF EVALUATION AND STRUCTURE:

Mid-term, Report writing/Presentation, Assignments, Quizzes, Final term.

A student's grade will be based on multiple measures of performance as mentioned below:

EVALUATION INSTRUMENTS (EI)	MARKS
Quizzes (4 Quizzes of 10 Marks)	10
Assignments (3 Assignments)	20
Mid Term Examination	20
Final Examination	50
Total	**100**

NOTE: Any change in this scheme/format will be communicated well in time.

MAPPING OF CLOS TO PLOS (PROGRAM LEARNING OUTCOMES)

PLO's	CLO's				
	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5
PLO:1 (Engineering Knowledge)	✓	✓			
PLO:2 (Engineering Problem Analysis)				✓	
PLO:3 (Designing and Development)			✓		✓
PLO:4 (Investigation)					
PLO:5 (Modern tool usage)					
PLO:6 (Engineer and Society)					
PLO:7 (Environment and Sustainability)					
PLO:8 (Professionalism and Ethics)					
PLO:9 (Individual and Team Work)					
PLO:10 (Communication)					
PLO:11 (Project Management)					
PLO:12 (Lifelong Learning)					

MAPPING OF CLOS TO COURSE EVALUATION INSTRUMENTS (EI)

EI	CLO's				
	CLO 1	CLO 2	CLO 3	CLO 4	CLO5
Assignments		✓	✓	✓	✓
Quizzes	✓	✓	✓	✓	
Projects					
Midterm Exam	✓	✓	✓	✓	
Final Exam	✓	✓	✓	✓	

GRADING SYSTEM:

Letter Grade *(& meaning)*		Percentage	Grade Point
A	Outstanding	87 – 100	4.0
B+	Very Good	80 – 86	3.5
B	Above Average	72 – 79	3.0
C+	Satisfactory	66 – 71	2.5
C	Barely Acceptable	60 – 65	2.0
D	Poor	50 – 59	1.5
F	Fail	Below 50	0.0
W	Withdrawal		
I	Incomplete Coursework		

For the semester FALL 2018 and onwards kindly refer Appendix II

COURSE RESOURCES

INSTRUCTOR:

NAME: Engr. **MAJID KALEEM**
DESIGNATION: **SENIOR ASST. PROF.**
OFFICE: **FACULTY ROOM #: 03** *(First Floor – New Engineering Building)*
EMAIL: **majidkaleem.bukc@bahria.edu.pk**

COUNSELING HOURS:

TUESDAY: 11:30 – 1:30
THURSDAY: 11:30 – 1:30

TEXTBOOKS:

1. Object-Oriented Analysis, Design and Implementation, Brahma Dathan, Sarnath Ramnath, Latest Edition, Universities Press

REFERENCE BOOKS:

2. Software Engineering: A Practitioner's Approach, Roger S. Pressman, Bruce R. Maxim, 8th Ed, McGraw-Hill Education, 2015.

3. Essential Software Architecture, Gorton I., latest Edition, Springer – Verlag

ONLINE REFERENCES:

1. https://cs.uwaterloo.ca/~rtholmes/teaching/2013winter/cs446/index.html
2. http://ocw.uniovi.es/course/view.php?id=177&sesskey=XTcVX93q9r
3. http://lcm.csa.iisc.ernet.in/soft_arch/Overview.html