



Course Specification

— (Bachelor)

Course Title: **Functional Programming**

Course Code: **SE1765**

Program: **Software Engineering**

Department: **Software Engineering**

College: **Faculty of Computer Science and Information Technology**

Institution: **Al-Baha University**

Version: **V1.0**

Last Revision Date: **24-April-2024**



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A. General information about the course:

1. Course Identification

1. Credit hours: (3)

3 Credit Hours (3, 0, 0) (Lecture, Lab, Tutorial)
(3 Contact Hours)

2. Course type

A. University College Department Track Others

B. Required Elective

3. Level/year at which this course is offered: (8th Level/3rd Year)

4. Course General Description:

This course demonstrates the usefulness of mathematics as a tool for software engineering. It introduces students to mathematical topics related to software engineering field. Mainly it emphasizes the concepts of lambda calculus and computational theory and its relation to the typed languages and functional programming languages. Moreover, the course introduces students to explore and practice these mathematical concepts using a functional language for a variety of real-world cases and contexts.

5. Pre-requirements for this course (if any): None

6. Pre-requirements for this course (if any): None

7. Course Main Objective(s):

This course teaches students the most important concepts of lambda calculus and their implementation through typed and functional programming.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	33	100%
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> Traditional classroom 		





No	Mode of Instruction	Contact Hours	Percentage
	• E-learning		
4	Distance learning		
5	Other (Lab)		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	33
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify)	
Total		33

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Recognize the concepts of lambda calculus and functional programs	K1	- Lectures	<i>Direct Assessment Tool</i> Midterm Exam Final exam <i>Indirect Assessment Tool</i> Course Exit Survey
1.2	Explain the use of lambda calculus for typed and functional programming languages	K2	- Lectures - Lab Work	<i>Direct Assessment Tool</i> Midterm exam Final exam <i>Indirect Assessment Tool</i> Course Exit Survey
2.0	Skills			





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.1	Solve real world problems using lambda calculus	S1	- Lectures - Lab work - Project	<i>Direct Assessment Tool</i> Project (rubric) Final exam <i>Indirect Assessment Tool</i> Course Exit Survey
2.2	Apply functional programming for a variety of contexts	S2	- Lectures - Lab work - Project	<i>Direct Assessment Tool</i> Project (rubric) Final exam <i>Indirect Assessment Tool</i> Course Exit Survey
3.0 Values, autonomy, and responsibility				
3.1	Engage in lifelong learning.	V1	-Small Groups	<i>Direct Assessment Tool</i> Project Presentation (rubric) <i>Indirect Assessment Tool</i> Course Exit Survey

C. Course Content

No	List of Topics (Lectures)	Contact Hours
1.	Introduction to lambda calculus and functional languages	4
2.	Pure lambda calculus	4
3.	Operations and conditional expressions	4
4.	Recursive functions	4
5.	Types and typed representations	3
6.	Lists and linear list processing	4
7.	Composite values and Trees	4
8.	Functional programming and LISP basics	6
9		
Total		33

No	Lab Topics	Contact Hours





Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	<ul style="list-style-type: none"> A classroom or lecture hall with a whiteboard for 25 students.
Technology equipment (projector, smart board, software)	<ul style="list-style-type: none"> A digital image projection system with a connection to a desktop computer and laptop computer. High speed Internet connection
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	<ul style="list-style-type: none"> Students Faculty Peer Reviewers Program Leader Course Coordinator 	<ul style="list-style-type: none"> Surveys (indirect). Direct feedback from students. Course evaluation by Peer Reviewers (indirect). Class visit by Program Leader (indirect). Comprehensive Course report (where we can find information about teaching difficulties and action plan)
Effectiveness of Students assessment	<ul style="list-style-type: none"> Students Faculty Peer Reviewers Program Leader Exam Evaluation Committee Course Coordinator 	<ul style="list-style-type: none"> Surveys (indirect). Direct feedback from students. Course evaluation by Peer Reviewers (indirect). Class visit by Program Leader (indirect) Exam evaluation by the Exam Evaluation Committee (indirect)
Quality of learning resources	<ul style="list-style-type: none"> Students Faculty Peer Reviewers Course Coordinator 	<ul style="list-style-type: none"> Surveys (indirect) Course evaluation by Peer Reviewers (indirect). Comprehensive Course report (where we can find information about difficulties and challenges about learning resources as well as consequences and action plan)
The extent to which CLOs have been achieved	<ul style="list-style-type: none"> Faculty Program Leader Course Coordinator 	<ul style="list-style-type: none"> Student Results (direct) Comprehensive Course report (where we can find



Assessment Areas/Issues	Assessor	Assessment Methods
		the CLO assessment results)
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Curriculum Committee
REFERENCE NO.	
DATE	28 April 2024

