



Course Specification

(Postgraduate Programs)

Course Title	Theory of Programming Languages
Course Code:	MSCS 627
Program:	Master Programme in Computer Science
Department:	Computer Science
College:	Computer Science and Information Technology
Institution:	King Faisal University
Version:	Course Specification Version Number
Last Revision Date:	Pick Revision Date.



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A. General information about the course:

1. Course Identification:

1. Credit hours: 3 (3-0-6)

2. Course type

A. ☐ University ☒ College ☐ Department ☐ Track
B. ☐ Required ☒ Elective

3. Level/year at which this course is offered: : Level 2 , 3 or 4

4. Course General Description:

Introduction to the main constructs of contemporary programming languages and criteria used for evaluating programming languages and language constructs: influence on language design, and design tradeoffs; Syntax and Semantics description: problems and formal methods; Lexical and Syntax Analysis; Characteristics of variables: Name bindings, type checking and scopes; Data types: Primitive data, character strings, user defined, arrays, record, union, pointer and reference types; Expression and assignment statements; Statement- level control structures: selection and iterative statements, unconditional branching, guarded commands; Subprograms and their implementation: fundamentals, design issues and implementation of simple subprograms; data abstraction facilities: Abstract data types and encapsulation constructs; Concurrent program units; exception handling and event handling; Alternative programming paradigms: functional programming and logic programming.

5. Pre-requirements for this course (if any):

NA

6. Pre-requirements for this course (if any):

NA

7. Course Main Objective(s):

This course introduces students to the main constructs of contemporary programming languages design and provides them with the tools necessary for the critical evaluation of existing and future programming languages

2. Teaching Mode: (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom		
2	E-learning		



No	Mode of Instruction	Contact Hours	Percentage
3	Hybrid <ul style="list-style-type: none"> Traditional classroom E-learning 	45	100%
4	Distance learning		

3. Contact Hours: (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	-
3.	Field	-
4.	Tutorial	-
5.	Others (specify).....	-
	Total	45

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

Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Understand the structure of programming languages	K1	Lectures	- Quizzes - Exams - Assignments
1.2	Describe the design issues of programming languages	K1	Lectures	- Quizzes - Exams - Assignments
2.0	Skills			
2.1	Develop skills in describing and using the features of programming languages	S1, S2	- Lectures	- Quizzes - Exams - Assignments



Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
2.2	Analyze the features of programming languages	S1, S2	- Lectures	- Quizzes - Exams - Assignments
2.3	Differentiate logic and imperative and functional programming languages	S1, S2	- Lectures	- Quizzes - Exams - Assignments
3.0	Values, autonomy, and responsibility			
3.1	Implement Programming language Techniques on real world problems	V1	- Lectures - Case studies - Research assignment	Project Report and Presentation
...				

C. Course Content:

No	List of Topics	Contact Hours
1	Introduction, History, Preliminaries	3
2	History of programming languages, Evolution of the Major Programming Languages.	3
3	Formalizing syntax, Regular expressions, BNF, Syntax and Semantics.	3
4	Names, Bindings, scopes, environments, pointers	3
5	Data types and polymorphism	3
6	Blocks, scope, subprograms	3
7	Implementing block structured languages, Implementing Subprograms	6
8	Abstract data types and modules, Encapsulation Constructs	6
9	Object-Oriented programming, Support for Object-Oriented Programming	3
10	Functional programming, Functional Programming Languages	3
11	Functional programming language: Haskell	6
12	Logic programming, Logic programming Language: PROLOG	6
Total		45

D. Students Assessment Activities:

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Assignments	Continuous	10%





No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
2.	Quiz	Continuous	10%
3.	Mid Term	8 th - 9 th	25%
4	Capstone Project	15 th	15%
5	Final Exam	16 th - 17 th	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities:

1. References and Learning Resources:

Required Textbook	Concepts of Programming Languages by Robert W. S., 9th Edition, Addison-Wesley, 2009. ISBN: 0136073476..
Essential References	Theories of Programming Languages by John C. Reynolds, 1st Edition, Cambridge University Press, 2009. ISBN: 0521106974.
Supportive References	
Electronic Materials	
Other Learning Materials	

2. Educational and Research Facilities and Equipment Required:

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Sufficient seats (typically 20) as per student registration required in the lecture
Technology equipment (Projector, smart board, software)	Sufficient computer terminals with required setup having the necessary software installed and configured for the students to complete assignments and projects. Data show is needed to demonstrate in the class
Other equipment (Depending on the nature of the specialty)	Not Required

F. Assessment of Course Quality:

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Indirect Assessment through Teaching Evaluation
Effectiveness of students' assessment	Faculty	Indirect assessment through Course Evaluation Survey



Assessment Areas/Issues	Assessor	Assessment Methods
Quality of learning resources	Students	Indirect Assessment through Learning Resources Survey
The extent to which CLOs have been achieved	Faculty	Direct assessment through Rubrics analyses
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval Data:

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	