



Course Specifications

Course Title:	Algorithms and Programming
Course Code:	281 CSC-3
Program:	Bachelor in Science
Department:	Computer Science
College:	College of Computer Science and Information Technology
Institution:	Jazan University, Jazan

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A. Course Identification

1. Credit hours: 03 Hours			
2. Course type			
a.	University <input type="checkbox"/>	College <input type="checkbox"/>	Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b.	Required <input checked="" type="checkbox"/>	Elective <input type="checkbox"/>	
3. Level/year at which this course is offered: Level -4 / Year-02			
4. Pre-requisites for this course (if any): COMP-101			
5. Co-requisites for this course (if any): None			

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	44	95%
2	Blended		
3	E-learning		
4	Distance learning		
5	Other (Self Study)	6	5%

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	22
2	Laboratory/Studio	22
3	Tutorial	-
4	Others (Exams and Revision)	8
	Total	52

B. Course Objectives and Learning Outcomes

1. Course Description

This course introduces the fundamental concepts of Algorithm and Programming. It includes the basic concept of Algorithm: Flow chart and Pseudocode, Searching and sorting Algorithm, Basic Concept of Programming Language, Programming with C Language, Control Statements: Decision and Repetition, Functions : Library and user defined, Array: One dimensional and two dimensional, String and Pointers.

2. Course Main Objective

1. Discuss the basic of Algorithms, Algorithm Representation Techniques: Flow chart and pseudocode.
2. Discuss various searching and sorting Algorithms.
3. Discuss Evolution and Types of Language.
4. Explain the basic concept of C Programming such as character set, identifier, keywords, escape sequence, decision and repetition control statement, break, goto etc.
5. Discuss Arrays and Strings.

6. Explain basic concept of Function and Pointers.
7. Write and implement various programs using C in the lab, to demonstrate the concepts of C Language.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	<i>Describe</i> algorithm, flow chart, pseudocode, basic algorithms, searching and sorting algorithms.	K1
1.2	<i>Define</i> the types of programming languages and the basic concept of C Programming Language such as character set, identifier, keywords, escape sequence, decision and repetition control statement, break, goto, arrays, strings etc.	K2
2	Skills :	
2.1	<i>Utilize</i> flowcharts and pseudocode to understand the program modules.	S1
2.2	<i>Develop</i> programs to implement C concepts.	S3
2.3	<i>Show</i> the ability to find errors in the programs and fix them.	S4
3	Values:	
3.1	<i>Demonstrate</i> the ability to work in a group to achieve common assignments and activities in the field of algorithms and programming.	V2

C. Course Content

No	List of Topics	Contact Hours
1	CHAPTER -1 ALGORITHM: Definition of an Algorithm, Three construct for algorithm-sequence, decision, repetition. Algorithm Representations: flowchart, pseudocode. Basic Algorithm: Summation, Product, smallest, Largest. SORTING: Selection SEARCHING: Sequential Search and Binary Search. APPROACHES FOR ALGORITHM: iteration, recursion.	4T+4P
2	CHAPTER -2 PROGRAMMING LANGUAGE: Evolution-Machine Language, Assembly Language, High Level Language, Natural Language. PROGRAM: Definition, Building a program-Writing and Editing Program, Compiling Program, Linking Program, Program Execution. CATEGORIES OF PROGRAMMING LANGUAGE: Functional Language, Object Oriented Language, Declarative Language. Self-Study Topic(s): High Level Language, Special Languages.	2T+2P

3	<p>CHAPTER -3</p> <p>C FUNDAMENTALS: A brief history of C, Structure of a program, The character set, Identifiers, key words, data Types, Modifying Basic Types, Escape sequences, Variables, Initializing Variables, Storage Classes.</p> <p>CONSTANTS: Literal Constants, Named Constant, Symbolic constant.</p> <p>EXPRESSION: Operators: Arithmetic Operator, Unary Operator: The decrement and increment Operator, Relational Operator, Logical Operators, Assignment Operators, Conditional Operators and Operands.</p> <p>STATEMENTS: Expression statements, Compound statements, Control statements.</p> <p>Self-Study Topic(s): Order of Precedence.</p>	4T+4P
4	<p>CHAPTER -4</p> <p>FUNCTIONS: Data Input Output Function, Scanf Function, printf Function, format specifiers.</p> <p>USER DEFINED FUNCTIONS: Defining a function, Accessing a function, Function prototype, Passing arguments to a function, Recursion.</p> <p>Self-Study Topic(s): Library Functions</p>	4T+4P
5	<p>CHAPTER -5</p> <p>CONTROL STATEMENTS: BRANCHING: if else statement, Nested if statement, Ladder if statement, Switch Statement.</p> <p>LOOPING: The while statement, do while statement, for loop, break statement, GO TO statement.</p> <p>Self-Study Topic(s): continue Statement</p>	4T+4P
6	<p>CHAPTER -6</p> <p>ARRAYS: Defining an array, Array Initialization, Processing one-dimensional array, Two Dimensional Array.</p> <p>STRINGS: Introduction to strings, Manipulating Strings.</p> <p>POINTERS: Introduction to pointers, Pointers to variables, Dereferencing the Pointers.</p>	4T+4P
Total		22T+22P

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and Understanding		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.1	Describe algorithm, flow chart, pseudocode, basic algorithms, searching and sorting algorithms.	<ul style="list-style-type: none"> • Lectures/Presentations • Media Lectures • Lab Demonstration 	<ul style="list-style-type: none"> • Mid-Term Exam • Assignment-1 • Assignment-2 • Final Theory Exam • Lab Exam
1.2	Define the types of programming languages and the basic concept of C Programming Language such as character set, identifier, keywords, escape sequence, decision and repetition control statement, break, goto, arrays, strings etc.	<ul style="list-style-type: none"> • Lectures/Presentations • Media Lectures • Lab Demonstration 	<ul style="list-style-type: none"> • Mid-Term Exam • Assignment-1 • Assignment-2 • Final Theory Exam • Lab Exam
2.0	Skills		
2.1	Utilize flowcharts and pseudocode to understand the program modules.	<ul style="list-style-type: none"> • Lectures /Presentations • Media Lectures • Tutorials • Lab Demonstration 	<ul style="list-style-type: none"> • Mid-Term Exam • Assignment-1 • Final Theory Exam
2.2	Develop programs to implement C concepts.	<ul style="list-style-type: none"> • Lectures /Presentations • Media Lectures • Tutorials • Lab Demonstration 	<ul style="list-style-type: none"> • Mid-Term Exam • Assignment-1 • Lab Exam • Final Theory Exam
2.3	Show the ability to find errors in the programs and fix them.	<ul style="list-style-type: none"> • Lectures /Presentations • Media Lectures • Tutorials • Lab Demonstration 	<ul style="list-style-type: none"> • Mid-Term Exam • Assignment-1 • Assignment-2 • Lab Exam • Final Theory Exam
3.0	Values		
3.1	Demonstrate the ability to work in a group to achieve common assignments and activities in the field of algorithms and programming.	<ul style="list-style-type: none"> • Group Discussion • Team Work Demo • Presentation 	<ul style="list-style-type: none"> • Assignment-2

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Exam-1	5/6 th Week	15%
2	Assignment – 1	3 th Week	10%
3	Assignment – 2 (Group Assignment)	5 th Week	15%
4	Lab Exam	As per schedule	20%
5	Final Theory Exam	As per schedule	40%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

Department have an arrangement for “Academic Counseling and Support” for each student by the department. The Department Coordinator nominates faculty members for “**Student Academic Advisory Committee**” every semester. These “**Academic Advisors**” are

responsible for student counseling and advising to a group of fix number of students (around 10-15 students) and maintaining students' files. At the beginning of semester and at time of course registration all students take counseling from Academic Advisor according to his previous grades and coverage of pre-requisite course and follow-up.

Also students with GPA below than 2.00 are remained under deep observation and continuous meetings with respective course teachers about their performance are arranged to help and support the students. The course teacher is to be associated with this course provide a proper guidance for students who are looking to focus on their future career based on their intellectual interests, identify better opportunities related to this course and connections in their academic fields.

The course teacher will commit to a minimum scheduled time for student consultation equivalent to **3 HOURS PER WEEK** and will have prescribed times set aside for individual appointments with students. The students will be informed at the commencement of every semester for teacher consultation hours for seeking advice and support.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	<ul style="list-style-type: none"> Algorithms in a Nutshell, George T. Heineman, Gary Pollice, Stanley Selkow, O'Reilly Media, Inc., 2nd Edition, 2015, ISBN-13: 978-1491948927
Essential References Materials	<ul style="list-style-type: none"> Programming in ANSI C, E. Balagurusamy, Tata McGraw-Hill Education, 7th Edition, 2016, ISBN-13 : 978-9339219666
Electronic Materials	<ul style="list-style-type: none">
Other Learning Materials	<ul style="list-style-type: none"> Handouts

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom equipped with projector, whiteboard, and sufficient seating arrangements. Lab with software installed and individual computer terminal for each student.
Technology Resources (AV, data show, Smart Board, software, etc.)	Whiteboard and projector for classroom and lab. Following software for lab work: Visual Studio 2017 / Dev C++
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Sufficiency of resources and facilities for students	Students	Course evaluation survey form
Effectiveness of teaching / learning process	Students	Course evaluation survey form
Effectiveness of teaching / learning process	CRC / QAU / HoD	Course reports / result analysis
Effectiveness of teaching and interaction with students	TL/HOD	Classroom monitoring
Quality of learning Resources	Track leaders / CRC	Review meetings and star rating with suggestions for further modification and improvements
Verifying standards of student achievement / evaluation	HoD / committee nominated by HoD	Random re-checking of evaluated answer sheets
Achievement of course learning outcomes	Course Teachers / QAU	CLO assessment template that is further verified at course coordinator and QAU level.

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

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

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Department Council
Reference No.	001/1443/02
Date	12/10/2021