RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 1
Branch	**Computer Science and Engineering**	**Semester**	**5th**
Course Code — C04	**Course Name** — **Algorithm Design and Analysis**		

		Teach Hrs	Marks
Course Outcome 1	• Describe the analysis of algorithm efficiency using different notations.	30	30
Learning Outcome 1	• Demonstrate the basic data structure and algorithm.	8	PT 1(10)

Contents	• Introduction to Algorithm:
	   o Basic Algorithmic problem solving, Types of problem.
	• Measuring Running time complexity on the basis of the input size
	• Orders of Growth Worst-case, Best-case and Average-case efficiencies,
	   o Asymptotic Notations and O-notation, Ω-notation, θ-notation		

Method of Assessment	Internal Theory Examination		
Learning Outcome 2	• Calculate the sum of first n^{th} terms of a series.	12	ET(10)
Contents	• Introduction to Functions and Series: o Exponential and Logarithmic Functions • Arithmetic Progression (A.P.), Geometric Progression (G. P.), Sum of n terms of A.P./ G.P./ Combination of A.P. and G.P., Solving summation, Sum of first n natural numbers, Sum of squares of the first n natural numbers.		
Method of Assessment	End Term Theory Examination		

Learning Outcome 3	• Describe various recursive and non-recursive algorithms.	10	ET(10)
Contents	• Mathematical analysis of non-recursive algorithms and recursive algorithms. • Solving Recurrence relation using Master Theorem		
Method of Assessment	End Term Theory Examination		
Course Outcome 2	• Express the various searching and sorting problem.	25	30
Learning Outcome 1	• Explain various Searching algorithms and also its performance characteristics.	7	ET(10)
Contents	• Analysis of Sorting and Searching • Introduction to Brute Force approach, Divide-and-Conquer approach • Binary Search tree, Balance binary Search tree, related properties. • Hashing techniques and collision resolving using linear probing, quadratic probing and Separate chaining		
Method of Assessment	End Term Theory Examination		
Learning Outcome 2	• Discuss the problems of Brute Force approach and decrease-and-Conquer.	8	ET(10)

Contents	• Brute Force approach:
	    o Linear Search
	    o Selection sort, Bubble sort
	• Decrease-and-Conquer:
	    o Insertion Sort		

Method of Assessment	End Term Theory Examination		

Learning Outcome 3	• Discuss the problems of Divide-and-Conquer approach.	10	ET(10)
Contents	• Divide-and-Conquer approach o Binary Search, Merge Sort, Quick Sort, related properties.		
Method of Assessment	End Term Theory Examination		
Course Outcome 3	• Describe the graph structure and its operations.	20	20
Learning Outcome 1	• Explain the various major components of graph and topological sorting technique.	10	TW(10)
Contents	• Introduction of Graph: • Definition of a directed and undirected graph. • Paths, Cycles, Spanning trees. • Directed Acyclic Graphs. • Topological Sorting.		
Method of Assessment	Internal Quiz/Assignments		
Learning Outcome 2	• Write an algorithm to calculate minimum weight spanning tree in a connected graph.	10	ET(10)
Contents	• Introduction to Greedy approach • Minimum Spanning Tree algorithms. • Prim's Algorithm, Kruskal's Algorithm • Shortest Path algorithms: Dijkstra's Algorithm.		
Method of Assessment	End Term Theory Examination		

Course Outcome 4	• Discuss the basic String related operations.	15	20
Learning Outcome 1	• Explain string sorting and substring searching.	8	ET(10)
Contents	• String Problem • Sorting, Tries, Substring Search		
Method of Assessment	End Term Theory Examination		
Learning Outcome 2	• Illustrate basic pattern matching and data compression.	7	PT II(10)
Contents	• Regular Expressions, Elementary Data compression.		
Method of Assessment	Internal Theory Examination		

Abbreviation:

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code		Course Code		CO Code	LO Code	Format No. **4**
		C	**0**	**4**		*1*	*1*	

COURSE NAME	Algorithm Design and Analysis
CO Description	Describe the analysis of algorithm efficiency using different notations.
LO Description	Demonstrate the basic data structure and algorithm.

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	• Introduction to Algorithm: o Basic Algorithmic problem solving, Types of problem. • Measuring Running time complexity on the basis of the input size • Orders of Growth Worst-case, Best-case and Average-case efficiencies, Asymptotic Notations and O-notation, Ω-notation, θ-notation	Interactive classroom teaching, demonstration, quiz, assignments, tutorial Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	05	03	Handouts / Books / E-Contents	NIL

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Internal Theory Examination	**Progressive Test**	**10**	**Test Paper**	**Internal**

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code		Course Code		CO Code	LO Code	Format No. **4**
		C	0	4		1	2	

COURSE NAME	Web Technology
CO Description	Describe the analysis of algorithm efficiency using different notations.
LO Description	Calculate the sum of first n^{th} terms of a series.

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	• Introduction to Functions and Series: • Exponential and Logarithmic Functions • Arithmetic Progression (A.P.), Geometric Progression (G. P.), Sum of n terms of A.P./ G.P./ Combination of A.P. and G.P., Solving summation, Sum of first n natural numbers, Sum of squares of the first n natural numbers.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	08	04	Handouts / Books / E-Contents	NIL

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	End Term Theory Examination	**End Term**	**10**	**Test paper**	**External**

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code		CO Code	LO Code	Format No. **4**
		C	0	4			1	3	

COURSE NAME	**Web Technology**
CO Description	Describe the analysis of algorithm efficiency using different notations.
LO Description	Describe various recursive and non-recursive algorithms.

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	• Mathematical analysis of non-recursive algorithms and recursive algorithms. • Solving Recurrence relation using Master Theorem	Interactive classroom teaching, demonstration, quiz, assignments, tutorial Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	06	04	Handouts / Books / E-Contents	NIL

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	End Term Theory Examination	**End Term**	**10**	**Test paper**	**External**

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code		CO Code	LO Code	Format No.
		C	0	4			2	1	**4**

COURSE NAME	Web Technology
CO Description	Express the various searching and sorting problem.
LO Description	Explain various Searching algorithms and also its performance characteristics.

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	• Analysis of Sorting and Searching • Introduction to Brute Force approach, Divide-and-Conquer approach • Binary Search tree, Balance binary Search tree, related properties. • Hashing techniques and collision resolving using linear probing, quadratic probing and Separate chaining	Interactive classroom teaching, demonstration, quiz, assignments, tutorial Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	05	02	Handouts / Books / E-Contents	NIL

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	End Term Theory Examination	**End Term**	**10**	**Test paper**	**External**

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code		CO Code	LO Code	Format No. **4**
		C	0	4			2	2	

COURSE NAME	**Web Technology**
CO Description	Express the various searching and sorting problem.
LO Description	Discuss the problems of Brute Force approach and decrease-and-Conquer.

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks

1	• Brute Force approach:
	    o Linear Search
	    o Selection sort, Bubble sort
	 • Decrease-and-Conquer:
	    o Insertion Sort.
		Interactive classroom teaching, demonstration, quiz, assignments, tutorial Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	06	02	Handouts / Books / E-Contents	NIL

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	End Term Theory Examination	**End Term**	**10**	**Test paper**	**External**

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code		Course Code		CO Code	LO Code	Format No. **4**
		C	0	4		2	3	

COURSE NAME	Web Technology
CO Description	Express the various searching and sorting problem.
LO Description	Discuss the problems of Divide-and-Conquer approach.

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	• Divide-and-Conquer approach o Binary Search, Merge Sort, Quick Sort, related properties.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	06	04	Handouts / Books / E-Contents	NIL

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	End Term Theory Examination	**End term**	**10**	**Test Paper**	**External**

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code		CO Code	LO Code	Format No. **4**
		C	*0*	*4*			*3*	*1*	

COURSE NAME	Web Technology
CO Description	Describe the graph structure and its operations.
LO Description	Explain the various major components of graph and topological sorting technique.

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	• Introduction of Graph: • Definition of a directed and undirected graph. • Paths, Cycles, Spanning trees. • Directed Acyclic Graphs. • Topological Sorting.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	06	04	Handouts / Books / E-Contents	NIL

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Internal Quiz/Assignments	Term Work	10	Assignment /quiz questions	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code		CO Code	LO Code	Format No. **4**
		C	0	4			3	2	

COURSE NAME	**Web Technology**
CO Description	Describe the graph structure and its operations.
LO Description	Write an algorithm to calculate minimum weight spanning tree in a connected graph.

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	• Introduction to Greedy approach • Minimum Spanning Tree algorithms. • Prim's Algorithm, Kruskal's Algorithm • Shortest Path algorithms: Dijkstra's Algorithm.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	06	04	Handouts / Books / E-Contents	NIL

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	End Term Theory Examination	End term	10	Test paper	external

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code		CO Code	LO Code	Format No. **4**
		C	0	4			4	1	

COURSE NAME	Web Technology
CO Description	Discuss the basic String related operations.
LO Description	Explain string sorting and substring searching.

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	• String Problem • Sorting, Tries, Substring Search	Interactive classroom teaching, demonstration, quiz, assignments, tutorial Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	06	02	Handouts / Books / E-Contents	NIL

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	End Term Theory Examination	**End term**	**10**	**Test paper**	**external**

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

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<tr><td rowspan="2">**RGPV (Diploma Wing) Bhopal**</td><td rowspan="2">**SCHEME FOR LEARNING OUTCOME**</td><td>**Branch Code**</td><td colspan="2">**Course Code**</td><td>**CO Code**</td><td>**LO Code**</td><td rowspan="2">Format No. **4**</td></tr>
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COURSE NAME	**Web Technology**
CO Description	Discuss the basic String related operations.
LO Description	Illustrate basic pattern matching and data compression.

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SCHEME OF STUDY

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S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	• Regular Expressions, Elementary Data compression.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	05	02	Handouts / Books / E-Contents	NIL

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SCHEME OF ASSESSMENT

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S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Internal Theory Examination	**Progressive Test-II**	**10**	**Test Paper**	**Internal**

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ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

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